



Pay for Success Financing to Address Asthma in Springfield, MA Feasibility Study Final Report

December 2016



This material is based upon work supported by the Corporation for National and Community Service (CNCS) under Social Innovation Fund Grant No. 14PSHMD001. Opinions or points of view expressed in this document are those of the authors and do not necessarily reflect the official position of, or a position that is endorsed by, CNCS.”

Founded in 1986, the Green & Healthy Homes Initiative (GHHI), formerly the Coalition to End Childhood Lead Poisoning, is a national 501(c)3 nonprofit organization that provides evidence-based direct services and technical assistance to create healthy, safe and energy efficient homes, improving health, economic and social outcomes for low-income families while reducing public and private healthcare costs.

We would like to acknowledge the teams at Baystate Health, Partners for a Healthier Community, Revitalize Community Development Corp, City of Springfield, Springfield Partners for Community Action, Health New England, Calvert Foundation, Milliman, Health Management Associates, and Social Finance for their contributions to this feasibility project, which resulted in the production of this report. We are tremendously grateful for their participation and support throughout this project.

© 2017. All materials are copyrighted and the sole property of the Green & Healthy Homes Initiative. For copies of material or if you have any questions, comments, or concerns, please contact info@ghhi.org

GHHI authors:
Ruth Ann Norton
Michael McKnight
Kevin Chan
Andrew Olson
Brendan Brown
Trent Van Alfen

Executive Foreword

How Pay for Success can help break the link between unhealthy housing and unhealthy families.

Asthma is a medical condition that affects 25 million people in the United States, including 7 million children¹. Many of these individuals cycle in and out of emergency departments and hospitals because they do not receive effective care management, which includes home visiting and addressing asthma triggers like mold, pests, and smoking. The Robert Wood Johnson Foundation's Commission to Build a Healthier America reported that home-based triggers caused 40% of acute asthma episodes. The cost of medical treatment for severe asthmatic episodes far exceeds the cost of preventive measures, and that cost differential provides an opportunity for the healthcare system to better address key environmental determinants of health. We can leverage innovative new funding models like Pay for Success to improve asthma care, driving down healthcare costs through comprehensive home-based interventions.

With generous support from the Corporation for National and Community Service's Social Innovation Fund, the Green & Healthy Homes Initiative provided technical assistance and capacity building services to a cohort of five projects. The purpose of these projects was to determine the feasibility of using Pay for Success to finance the delivery of home-based preventive services for individuals with asthma.

This report presents findings and recommendations from our feasibility project in Springfield. We hope that the contents of this report will help elevate the conversation around our nation's approach to public health, and demonstrate how we can use Pay for Success as a tool to help break the link between unhealthy housing and unhealthy families.



*Ruth Ann Norton, President & CEO
Green & Healthy Homes Initiative*

¹ Centers for Disease Control and Prevention: National Center for Health Statistics, National Health Interview Survey Raw Data, 2011. Analysis by the American Lung Association Research and Health Education Division using SPSS and SUDAAN software.

Executive Summary

Background and Overview

Starting in June of 2015, Green & Healthy Homes Initiative (GHHI) led a cohort of healthcare and service provider partners in five sites through asthma-focused Pay for Success (PFS) feasibility studies with funding from the Corporation for National and Community Service's (CNCS) Social Innovation Fund. In Springfield, Baystate Health and Partners for a Healthier Community submitted a proposal and won a technical assistance award to be part of the cohort. Over the course of 12 months, GHHI led the partnership through 10 technical assistance services that included in-depth analysis and capacity building to determine if an asthma-focused PFS transaction is feasible.

Feasibility Categories

This report analyzes project feasibility based on the following categories:

- Technical feasibility – the ability of the asthma intervention to deliver the desired outcomes and be evaluated as having done so.
- Economic feasibility – the ability of the project to deliver a net economic benefit, reach an appropriate volume, and allocate value among parties.
- Operational feasibility – the ability of the project team to effectively implement, scale, and manage the home-based asthma intervention.
- Sociopolitical feasibility – the ability to launch and implement the project with support from relevant internal and external stakeholder groups.
- Payment mechanism – the ability to operate the program, given the Medicaid payment mechanisms in place and other mechanisms potentially forthcoming.
- Capital availability – the ability to attract and secure capital as well as other guarantees from investors and foundations.

GHHI has discussed the above aspects of feasibility with the team throughout this project. This report draws from material that the team has developed over the course of the feasibility project and includes discussion points for each feasibility category. GHHI determines a rating (1-5) for each category as a framework for project assessment. The analysis

then turns to a discussion of alternative scenarios and final recommendations. The feasibility rating methodology for each category is defined using GHHI's Pay for Success Feasibility Rating Rubric (see Appendix A).

GHHI Feasibility Ratings

Based on the findings of the feasibility study, GHHI has rated the project on a scale of 1-5 across six core areas outlined below, producing an average feasibility rating of 3.67, with the lowest rating being a 3.0.²

Technical:	3.5	Average rating:	3.67
Economic:	3.75		
Operational:	3.0		
Sociopolitical:	4.0	Lowest rating:	3.0
Payment mechanism:	3.0		
Capital availability:	4.75		

Overall Assessment

With an average rating of 3.67 and a lowest rating of 3.0, the overall feasibility of a Pay for Success transaction is high. The Springfield project has ample capital availability, strong underlying economics, but questions remain on policy items related to the outcomes based payments and the operation of the full PFS model.

Path Forward

Upon review and discussion of the feasibility findings, the Springfield team has decided to proceed with a pilot to test the operational processes and improve overall project feasibility. The team plans to enter into transaction structuring activities in the upcoming months, after discussions with state Medicaid on policy considerations around the outcomes-based payment mechanism.

² While the project's median rating is important, we have indicated the lowest rating here because any one of the categories could prevent the project's successful completion.

Contents

Executive Foreword.....	i
Executive Summary.....	ii
Background and Overview	ii
Feasibility Categories.....	ii
GHHI Feasibility Ratings	iii
Path Forward	iii
Contents.....	iv
Overview	1
Asthma and the Need for Environmental Health Services	1
Local Asthma Burden	2
The Solution: Pay for Success.....	3
Project Partners and Goals	4
Healthcare Team.....	4
Service Provider Team	5
Technical Assistance Partners	6
Project Structure.....	6
Technical Feasibility.....	7
Key Takeaways.....	7
Evidence Base for Service Delivery Model	8
National Guidelines and Evidence	8
Planned Service Delivery Model and Alignment with National Guidelines	8
Demonstrated Outcomes and Operational Data	10
Actuarial Projections Related to Technical Feasibility	11
Evaluation Plans	13
Evaluation Considerations.....	14
Outcomes Evaluation.....	14
Process Evaluation.....	14
Broad Impact Study Plans	15

Economic Feasibility 16

 Key Takeaways..... 16

 Process Overview.....17

 Actuarial Projections..... 18

 Service Budgeting 18

 Economic Modeling 19

Actuarial Findings 19

 Subpopulation Stratification20

 Marginal Effect Size 21

 Attrition Rates.....22

Service Delivery Budget..... 23

 Budget considerations in Springfield 24

Transaction Costs 24

 Site specific transaction cost considerations.....26

Model Composition 26

Economic Analysis.....28

 Subpopulation Findings.....28

 Transaction Composition32

 Potential Scenarios 33

 Sensitivity Analysis 35

 Need for Actuarial Analysis36

 Dynamic Modeling.....36

Operational Feasibility 37

 Key Takeaways..... 37

 History and Relationships38

 Track Record for Separate Services38

 Track Record for Combined Services39

PFS Service Delivery Plans39

Roles and Responsibilities	39
Enrollments.....	40
Process Flow.....	40
Performance Management Plans.....	41
Pilot Phase.....	41
Scaling Capacity.....	42
Current Scale.....	42
Scaling Plans	42
Project Management Capacity.....	43
Sociopolitical Feasibility	44
Key Takeaways.....	44
Local Context and Appetite for Innovation.....	45
Internal and External Key Stakeholders	45
Analysis	45
Engagement	46
Payment Mechanism Feasibility	47
Key Takeaways.....	47
Payment Mechanism Challenge in Medicaid.....	48
Payment Mechanism Options and Viability	49
Site-Specific Background.....	50
Capital Availability	53
Key Takeaways.....	53
Investor Inventory	54
National Landscape	54
Local Landscape.....	54
Analysis and Discussion of Alternatives	56
Maintain Status Quo.....	56
Funding of Services without Pay for Success	56

Funding of Services at State Level..... 57
 Reimbursement for All or a Subset of Services..... 57
 Conclusion and Final Recommendations 59
 Notes..... 61
 Bibliography 62
 Appendix A: PFS Feasibility Rating Rubric 63
 Appendix B: List of Deliverables..... 64

Overview

Asthma and the Need for Environmental Health Services

Asthma is a chronic, non-communicable, and potentially lethal medical condition that inhibits breathing by restricting a person's airways. The condition has enormous social and financial costs. In 2013, it affected 25.5 million people in the United States, causing 1.58 million days spent in hospitals and claiming the lives of 3,600 people.³ The annual cost of asthma is estimated to be \$56 billion in the United States.⁴

In recent years, Medicaid agencies have established fixed-price payment mechanisms, in which the managed care organization (MCO) providing care to a patient assumes the financial risk for changes in the cost of care. This shift has created direct economic incentives for the provision of cost-effective, preventive intervention services. This also creates an opportunity for impact investors to make a positive social and economic impact by providing risk capital to scale these services and measure the outcomes.

In general, the guidelines-based service delivery model for asthma consists of healthcare and community partners providing components of care management, in-home asthma education, and housing improvement services. This comprehensive set of services provides the asthma patient and their family a holistic approach to the successful control of asthma. Exhibit 1 represents the general service delivery model that we have looked to apply across all feasibility sites.

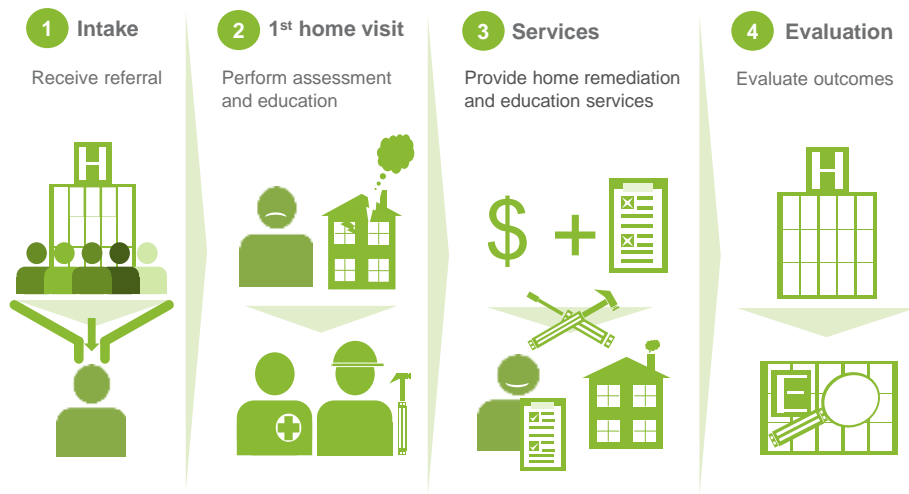
³ Centers for Disease Control and Prevention. February 2016. Accessed August 2016. <http://www.cdc.gov/nchs/fastats/asthma.htm>.

⁴ Centers for Disease Control and Prevention. May 2011. Accessed August 2016. <http://www.cdc.gov/vitalsigns/asthma/index.html>.

Exhibit 1



The model screens patients for intake, conducts a joint home-visit, delivers education and remediation services, which are evaluated independently.



© www.ghhi.org

Local Asthma Burden

The geographic focus of the Springfield asthma PFS project will be Springfield, Holyoke, West Springfield, and Chicopee. Asthma disproportionately affects Springfield area residents, with an overall prevalence of 18% for adults compared to 11% statewide.⁵ The Springfield area had a higher asthma hospitalization rate (16.1 per 10,000) than the state average (14.1 per 10,000).⁶ Public insurance was the expected payer for 62.6% of hospitalizations due to asthma. The local area also has the fifth highest age-adjusted rate of asthma hospitalizations out of the state’s twenty-seven community health network areas. The prevalence of lifetime asthma among elementary and middle school children was statistically significantly higher in Springfield and Holyoke compared to the state average. Springfield school children have an estimated asthma prevalence of 20%, double the national average. In the local area, there are significant racial and ethnic disparities in asthma. Latinos and Blacks experience asthma emergency room visit rates disproportionately higher than Whites in Springfield, with rates 3.4 and 1.9 times greater than Whites, respectively.

⁵ Massachusetts Department of Public Health. Behavioral Risk Factor Surveillance System (BRFSS).

⁶ Burden of Asthma in Massachusetts. Massachusetts Department of Public Health Asthma Prevention and Control Program, 2009. <http://www.mass.gov/eohhs/docs/dph/com-health/asthma/burden-in-mass.doc>

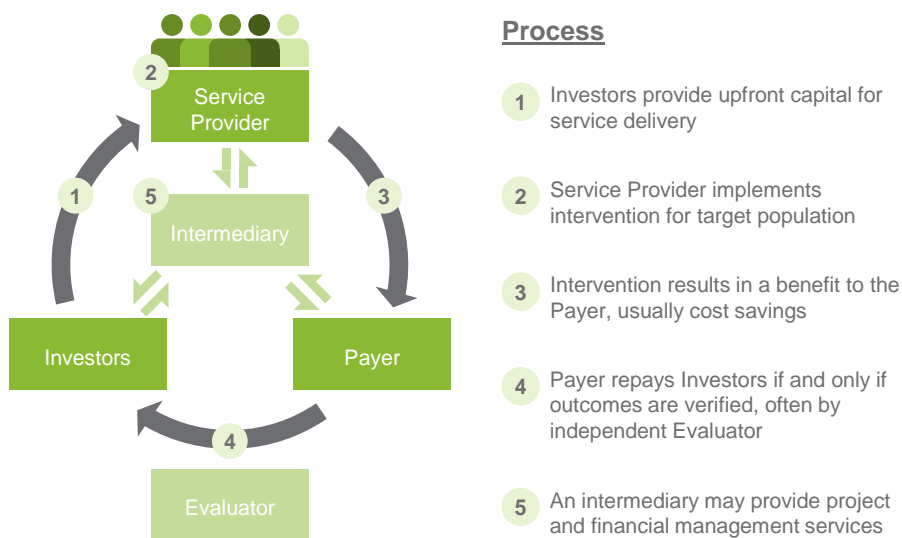
The Solution: Pay for Success

Pay for Success is a financing mechanism that provides a path forward for healthcare payers to scale home-based asthma services and measure associated cost savings, while at the same time transferring the upfront financial risk of funding these services to outside investors. The basic PFS model is a partnership in which private investors pay upfront for a social service and then government, healthcare, or other payer repays the investment *if and only if* agreed-upon outcomes are met. Exhibit 2 portrays the general structure and steps in a PFS transaction.

Exhibit 2



Pay for Success Model leverages outside capital to fund services and capital is returned only if the program is successful.



© www.ghhi.org

The evidence base for comprehensive asthma services is vast (see *Technical Feasibility*), but the healthcare system does not currently consider structural remediation of asthma triggers as medically relevant and reimbursable. Research shows that 40% of all incidents of asthma exacerbations are attributable to home-based environmental health hazards.⁷

⁷ Robert Wood Johnson Foundation Commission to Build a Healthier America (2009). *Beyond Health Care: New Directions to a Healthier America*. <http://www.rwjf.org/content/dam/farm/reports/reports/2009/rwjf40483>

Addressing these home asthma triggers has proven to significantly decrease rates of hospitalizations and emergency department (ED) visits.^{8,9} The gap between the knowledge of what services work for preventing asthma exacerbations and the coverage and provision of those services makes asthma an optimal application for PFS.

Project Partners and Goals

Baystate Health expressed the goal of utilizing pay for success to facilitate practice/provider transformation. Baystate views PFS as fitting with broad payment and practice reform; strengthening community based health teams, and improving quality and reducing costs. The focus on asthma would also fit with an organizational priority of reducing health disparities. Partners for a Healthier Community's Pioneer Valley Asthma Coalition is a multi-sector community coalition with a mission to improve the lives of families and communities that suffer from asthma. The PFS financing mechanism will allow the organization to scale and sustain their work.

Healthcare Team

Baystate is an integrated health system that includes four hospitals, an ACO that represents over 1400 physicians, a managed care organization (Health New England), and four community health centers. Baystate has 120,000 covered lives in alternative payment models in western Massachusetts. Baystate has a long history of innovative asthma initiatives, including the High Street Pediatric Health Center's Reducing Ethnic/Racial Asthma Disparities in Youth (READY) program that is part of the "New England Asthma Innovations Collaborative," a Center for Medicare and Medicaid Innovation-supported initiative. Baystate is the major western Massachusetts provider caring for low-income patients. Baystate is the 4th highest provider in the Commonwealth of Medicaid services (as a percent of total expenses).

⁸ Task Force on Community Preventive Services (2011). Recommendations from the Task Force on Community Preventive Services to decrease asthma morbidity through home-based, multi-trigger, multicomponent interventions. *American Journal of Preventive Medicine*, 41 (2S1), S1-S4.

⁹ Norton, Ruth Ann & Brown, Brendan Wade (2014). Green & Healthy Homes Initiative: Improving Health, Economic, and Social Outcomes Through Integrated Housing Intervention. *Environmental Justice*, 7(6): 151-157. doi:10.1089/env.2014.0033.

Service Provider Team

Partners for a Healthier Community (PHC), is a nonprofit Public Health Institute committed to building measurably healthier communities through civic leadership, collaborative partnerships, and advocacy. PHC provides skills, expertise and experience to create successful public health campaigns and sustainable system changes to improve health and well-being in Western Massachusetts. PHC provides “backbone” support to the region in a variety of areas, including: design and implementation of population-based health programs; convening of multi-sector partnerships; and research and evaluation. PHC convenes the Pioneer Valley Asthma Coalition (PVAC). PVAC’s strategies to address asthma involve improving medical and self-management of asthma as well as reducing environmental triggers at home, in school and in the community as a whole. PVAC focuses on policy and systems change to ensure that efforts are sustainable and have the highest potential for impact. PVAC has been involved in many prior asthma studies and projects including the Building Asthma Safe Home Environments Project and Reducing Asthma Triggers for Older Adults with Asthma.

The service provider team also includes Revitalize CDC and Springfield City Office of Housing, which will focus on the home assessment and remediation services. Revitalize CDC performs critical repairs and rehabilitation to the homes of low-income families with children, the elderly, military veterans and people with disabilities. The Office of Housing has numerous resources including an emergency repair program and a heating system repair/replacement program, and it coordinates closely with the City’s Code Enforcement Department. The Office of Housing was awarded \$4.5 million in the National Disaster Resilience Competition in 2016, which it will use to implement a Healthy Homes Rehabilitation Program in one or more target neighborhoods.

The Baystate Medical Center Pulmonary Rehabilitation center has clinicians including certified asthma educators who will deliver services in the clinical and medical management area.

Technical Assistance Partners

Health Management Associates (HMA) is a leading independent national research and consulting firm in the healthcare industry. HMA was founded in 1985 by Jay Rosen and a handful of other like-minded, experienced public officials. They believed in the value and importance of publicly financed health care programs in America and envisioned an increasingly demanding role for states in this arena. They saw opportunities to reform the system and to make public dollars work harder and go farther.

Milliman is among the world's largest providers of actuarial and related products and services. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe. They have valuable experience in working with federal- and state-level Medicaid offices in establishing reimbursement rates for various healthcare industries.

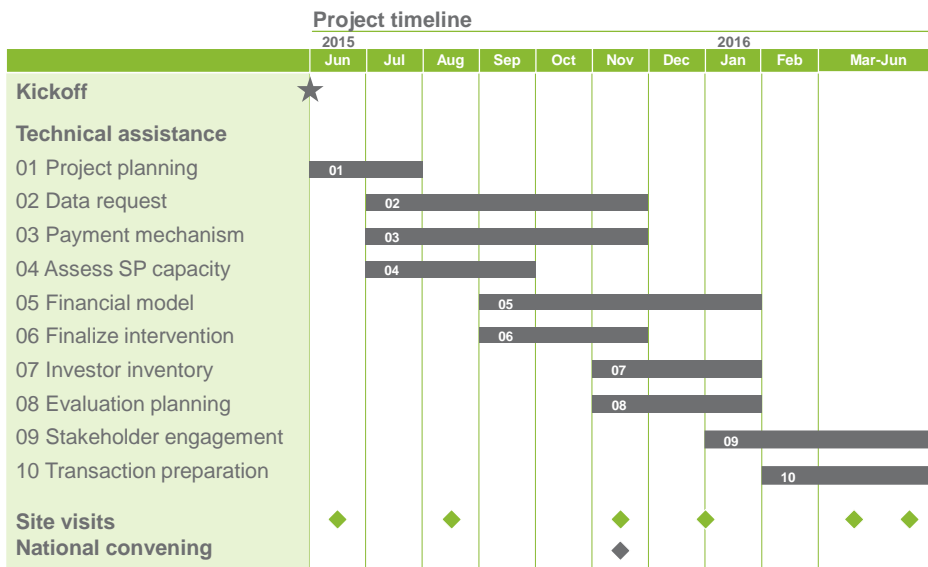
Project Structure

GHHI divided the overall feasibility project into 10 distinct technical assistance (TA) services, each having its own set of activities and deliverables. Exhibit 3 summarizes the timeline of TA services over the course of the project. A list of each TA service and related deliverables is included in Appendix B.

Exhibit 3



Assistance delivery to the cohort is strategically staggered to allow knowledge sharing, for parallel work streams and flexibility.



Source(s): GHHI

Technical Feasibility

An assessment of the project's intervention to deliver the expected results, including a brief review of previous literature and research.

The purpose of examining technical feasibility is to understand the ability of the project team's intervention to deliver improved health outcomes for a target population. In assessing technical feasibility, we consider the broader evidence base of similar interventions, the project team's own outcomes and evaluation results when available, characteristics of the intervention target population, actuarial projections of the intervention's effect size, and the team's ability to evaluate the proposed intervention.

Key Takeaways

- The Springfield Asthma PFS intervention aligns with evidence-based guidelines for asthma management, including self-management education, assessment, medication support and environmental remediation of asthma triggers.
- While partners have completed several asthma projects and studies in Springfield that show positive outcomes, the full set of PFS intervention services including the environmental remediation interventions has not been studied. Partners will be launching a pilot in the fall of 2016.
- The projections created by our actuarial partners for Springfield show a strong impact produced by the intervention on medical utilization and costs for Health New England (managed care organization).
- The team has a strong data management plan and a clear set of planned outcomes and process evaluation metrics. The data management plan will be tested during the pilot.

GHHI Rating for Technical Feasibility: 3.5 / 5.0

Evidence Base for Service Delivery Model

National Guidelines and Evidence

Research findings from the NIH, the Centers for Disease Control, and other clinical experts indicate that asthma is triggered by environmental factors, but is controllable through comprehensive asthma care management. According to the National Heart, Lung, and Blood Institute Expert Panel Report 3 (NHLBI EPR-3) the four components of asthma care management are 1) assessment and monitoring of asthma severity and control, 2) education for a partnership in care, 3) control of environmental factors and comorbid conditions that affect asthma, 4) and medication.

The Centers for Disease Control and Prevention’s Community Preventive Services Task Force implemented a systematic review of studies that focus on home-based multi-trigger, multicomponent environmental interventions for asthma management and found compelling evidence, which they published on the Community Guide website. Comprehensive interventions studied involved at least an assessment of the home environment, changing the indoor home environment to reduce exposure to asthma triggers, and education about the home environment. The review indicates a median decrease of 0.57 acute healthcare visits per year and cost-benefit studies also show a return of \$5.3 to \$14.0 for each dollar invested.¹⁰

Planned Service Delivery Model and Alignment with National Guidelines

To gain a better understanding of how the set of planned services in Springfield compares to those set forth in the broader evidence base, we turned to the Expert Panel Report 3: Guidelines for Diagnosis and Management of Asthma (EPR-3) and Asthma Community Guide Systematic Review. The team already addresses three of the four components of asthma management through current practices (assessment and monitoring; education; medication). The planned, coordinated intervention between all service providers addresses the fourth component: environmental control. Exhibit 4 summarizes the environmental control interventions recommended by EPR-3 and the Community Guide, and in-

¹⁰ Asthma Control: Home-Base Multi-Trigger, Multicomponent Environmental Interventions. Community Preventive Services Task Force. 2011. Accessed August 2016. <http://www.thecommunityguide.org/asthma/multicomponent.html>.

icates whether these services have been included in the Springfield Asthma PFS intervention services. The planned intervention does include services and supplies that address all applicable environmental components as recommended in EPR-3 and the Community Guide.

Exhibit 4

Checklist of environmental factors

EPR-3 and Community Guide Asthma Interventions for Control of Environmental Factors		
Intervention for Control of Environmental Factors	Inclusion	Notes
Dust Mites and Allergens		
Allergen impermeable covers: Encase mattresses, and pillows with allergen impermeable covers	Yes	BPR*
Frequent Washing/Cleaning: If possible, wash all clothing, stuffed toys and linens at high temperatures. If hot water is not available, use detergent and bleach.	Yes	BPR (education)
Reduce Humidity; Reduce indoor humidity to or below 60%. Ideally, humidity should be at 30-50%.	Yes	RCDC* / SpOH*
Remove Carpets and stuffed toys: If necessary, remove carpets from the patient’s bedroom and minimize the number of stuffed toys.	Yes	RCDC / SpOH
Domestic Hygiene, Pests, and Refuse		
Cockroaches - Integrated Pest Management Strategies: clean surfaces and floors, seal trash containers, and store food carefully. Use gel or bait traps to control insects.	Yes	RCDC / SpOH
Rodents - Integrated Pest Management Strategies: filling holes, vacuuming, cleaning, using low-toxicity pesticide, placing traps, and storing food carefully.	Yes	RCDC / SpOH
Mold		
Clean or Discard Contaminated Materials: Clean surfaces that have mold/fungi present. If cleaning is not possible, discard mold contaminated materials such as carpet, and ceiling tiles.	Yes	RCDC / SpOH
Fix leaks and Dampness Sources: Because of the link between mold and asthma, measures that remove or control indoor dampness can be effective. Sealing structural air leakages and cleaning wet areas (Kitchen, bathroom etc.) can help reduce dampness.	Yes	RCDC / SpOH
Humidity: Reduce indoor humidity to or below 60%, ideally 30–50%. Basements are frequently susceptible to mold, therefore, it is recommended that basements are well ventilated or dehumidified if possible.	Yes	RCDC / SpOH
Environmental Tobacco Smoke		
Smoking cessation programs: Refer caregivers to smoking cessation plan if they smoke and have children with asthma	Yes	BPR (referral)

Indoor Smoking Bans: Ban any resident or visitor to the homes from smoking and possibly close to the home of asthmatic children.	Yes	BPR (education)
Volatile Organic Compounds		
Reduce Exposure: Discuss ways to reduce exposure to VOCs. This may include replacing flooring with safer alternatives, switching to alternative cleaning products, or limiting the use irritants around individuals with asthma.	Yes	RCDC / SpOH
Ventilation: Ensure that the home adequately ventilates and circulates fresh air into and around the home.	Yes	RCDC / SpOH
Animal Allergen		
Remove Animal: If the patient is sensitized to an animal allergen, remove the animal from the home.	Yes	BPR (education)
Isolate Animal from Patient: If removal is not an option, keep animal from the patient's bedroom and keep bedroom door closed. Remove upholstered furniture and carpets that easily hold animal fur and dander or isolate the pet from these items to the extent possible.	Yes	BPR (education)

*RCDC is Revitalize CDC.

*SpOH is Springfield Office of Housing

*BPR is Baystate Medical Center Pulmonary Rehabilitation

Demonstrated Outcomes and Operational Data

From 2008-2011, PVAC conducted its first asthma home visiting pilot with Baystate High Street Health Center Pediatrics (BSHSCP), as part of PVAC's EPA Healthy Communities Grant Building Asthma Safe Environments (BASE) program. The pilot was a community health worker intervention that encompassed asthma education, environmental assessments, and environmental remediation behavior change and tools. Outcomes included reduced exposure to environmental conditions that trigger asthma in homes of children with asthma, increased understanding of how to use tools and supplies to reduce exposure to environmental asthma triggers in the home, and how to reduce pest exposure in the home as part of Integrated Pest Management (IPM). Using a home environmental contract, all 40 families committed to take action to improve their home environment to reduce asthma triggers and showed increases in their knowledge of actions to take to reduce exposure to asthma triggers. Eighty-seven percent of participants had improved asthma symptoms as reported by improved ACT scores.

The Older Adult Asthma Home Visiting Program launched in early 2015 and integrated asthma management and home environmental remediation into existing home outreach services. Health Outreach Workers (HOWs) conducted asthma home visits and provided supplies, education, and an environmental assessment.

Baystate is one of two sites of the Massachusetts Department of Public Health’s Reducing Ethnic and Racial Asthma Disparities in Youth (READY) asthma home visiting research study. The study is a cost analysis of low cost home interventions and its impact on acute care services, emergency medication and other outcome measures. READY served 225 asthma patients and demonstrated substantial decrease in medical utilization, including 33.6% decrease in ED visits, 23.1% decrease in hospitalizations.

Revitalize CDC has provided home repair and modification services to 165 homes from 2012-2015 for an average cost of \$6,667 per home. Services included mold remediation, carpet removal, roof and gutter repair, ventilation services, window replacement, and insulation and weatherization services.

Actuarial Projections Related to Technical Feasibility

The effectiveness of the intervention and resulting outcomes depends on the ability of the service provider team to design, deliver, and implement an integrated model of asthma care management including home environmental health services for the remediation of asthma triggers.

Data extract criteria
<p>Ages: 3-18 (pediatric group), >18 (adult group)</p> <p>Geography: Springfield, Holyoke, West Springfield, or Chicopee</p> <p>Event Triggers: At least one inpatient visit; At least one ED visit; At least one Urgent care visit;</p>

Project Period Assumptions

The significance of implementing all four components of comprehensive asthma care management in the integrated model is reflected in the fact that the treatment effect of the actuarial projections utilizes the EPR-3 guidelines as necessary and sufficient to achieve the designated treatment effect assigned in the actuarial cost savings projections.

Service Period: 3 years
Evaluation period: 10 years

The actuarial analysis of cost savings projections is based on a holistic review of the evidence base for asthma interventions. As a result of assumed implementation of home-based, multi-trigger, multi-component interventions, Milliman's cost savings model projects decreased utilization of medical services across several cost categories—which is the marginal impact estimate used to determine each year of cost savings per enrollee. Milliman is an actuarial firm with national presence, and works with federal- and state-level Medicaid offices on establishing reimbursement rates for various healthcare industries. As a partner on this project, Milliman brings rigor to cost savings estimates so that potential funders and stakeholders can have confidence in the financial projections. The treatment effect sizes designated for each subpopulation are shown in Exhibit 5 and 6.

Exhibit 5



The actuaries assigned different treatment effects depending on cost-category over time, indicating a better trajectory for long-term health.

Benefit to Pediatric Subpopulation	Year 1	Year 2	Years >2
Facility Inpatient - Medical	25%	30%	40%
Facility Outpatient - Observation	25%	30%	40%
Facility Outpatient - Emergency Room - Hospital	25%	30%	40%
Facility Outpatient - Emergency Room - Urgent Care	25%	30%	40%
Physician Primary Care - Inpatient Visits	25%	30%	40%
Physician Specialist Services - Inpatient Visits	25%	30%	40%
Primary Care - Office/Home Visits	0%	0%	0%
Physician Specialist Services - Office/Home Visits	30%	35%	45%
Physician Primary Care - Urgent Care Visits	25%	30%	40%
Physician Specialist Services - Urgent Care Visits	25%	30%	40%
Physician Primary Care - ER and Observation Visits	25%	30%	40%
Physician Specialist Services - ER and Observation Visits	25%	30%	40%
Prescription Drugs	(5)%	(5)%	(5)%

Note(s): The above represents the actuarial projections of cost reductions (increases) due to the intervention, which is likely to raise prescription drug costs due to increased adherence to controller medications for asthma.

Source(s): GHHI representation of Milliman analysis

© www.ghhi.org

Exhibit 6



The actuaries assigned different treatment effects depending on cost-category over time, indicating a better trajectory for long-term health.

Benefit to Adult Subpopulation	Year 1	Year 2	Years >2
Facility Inpatient - Medical	17%	20%	27%
Facility Outpatient - Observation	17%	20%	27%
Facility Outpatient - Emergency Room - Hospital	17%	20%	27%
Facility Outpatient - Emergency Room - Urgent Care	17%	20%	27%
Physician Primary Care - Inpatient Visits	17%	20%	27%
Physician Specialist Services - Inpatient Visits	17%	20%	27%
Primary Care - Office/Home Visits	0%	0%	0%
Physician Specialist Services - Office/Home Visits	20%	23%	30%
Physician Primary Care - Urgent Care Visits	17%	20%	27%
Physician Specialist Services - Urgent Care Visits	17%	20%	27%
Physician Primary Care - ER and Observation Visits	17%	20%	27%
Physician Specialist Services - ER and Observation Visits	17%	20%	27%
Prescription Drugs	(5)%	(5)%	(5)%

Note(s): The above represents the actuarial projections of cost reductions (increases) due to the intervention, which is likely to raise prescription drug costs due to increased adherence to controller medications for asthma.

Source(s): GHHI representation of Milliman analysis

© www.ghhi.org

We expect that the services will outperform the designated treatment effect sizes based on national trends, since the service providers have a robust network to bring in other home improvements and social services. Springfield Partners for Community Action (SPCA) is a close partner and has weatherization resources. Springfield Office of Housing oversees home repair programs, which would only increase the impact of the intervention.

Evaluation Plans

During feasibility, the Springfield team developed plans for three areas of evaluation: outcomes evaluation, process evaluation, and broad impact studies. For the outcomes evaluation, parallel control groups could be used, where members who would meet the criteria for program participation but have not been enrolled in the project yet could be utilized as a comparison group. A stepped wedge design would account for a lowering over time of the comparison group.

The team created a preliminary data management plan, which organizes all the data-related plans and outlines outstanding issues. The data management plan serves as a source document from which the service provider team can further refine the necessary systems

and processes for managing intervention data during post-feasibility activities. Data management and data platform refinement will occur during a pilot launching in the fall of 2016. The selection of an independent evaluator has not occurred yet, but the team has identified several potential local evaluators.

Evaluation Considerations

Health New England claims data, the source for actuarial projections, only went back to 2015 because of a change in coverage for Medicaid members in Western Massachusetts. As a result, the actuaries relied on attrition data from multi-year data sets provided by GHHI's other asthma pay for success claims data provided by managed care organizations and Medicaid programs in other states. Additional analysis on the experienced attrition rate could come from MassHealth claims data.

Outcomes Evaluation

The team identified several potential metrics for the medical outcomes that will trigger success payments. After reviewing the actuarial projections and GHHI economic analysis, the team decided to focus on two outcomes: reduction of asthma-related (1) inpatient visits and (2) emergency department visits. These outcomes will potentially be the proxy measures for one broader outcome—reduction of total medical costs. Finalization of outcomes tied to success payments will take place with investors. Metrics that will be used as leading indicators include asthma control test scores and a health assessment survey.

Process Evaluation

The team outlined a set of key performance indicators (KPIs) to be monitored for process evaluation and performance management purposes. The planned KPIs, which will need to be finalized during transaction structuring, encompass metrics associated with volume, timing, attrition, participation, cost, compliance, frequency of environmental remediation measures, and more. Under the current data management plan, PHC will be leading the service provider team in process evaluation, and the Efforts-to-Outcomes (ETO) data platform will be utilized by service providers. Reports generated from ETO will be used for performance management activities.

Broad Impact Study Plans

The project team is interested in studying the broader impact beyond the direct outcomes metrics. Some of these broader impact metrics include:

- School attendance
- Caregiver employment attendance and productivity
- Family economic impact of asthma
- Health impact on other household members (asthmatics and non-asthmatics)

Further planning is required to assess which of these metrics are feasible to include in a broad impact study. The team may also need to secure separate funding for the study, since these metrics will not trigger success payments.

Urban Institute TTA

GHHI applied for and received an award from the Urban Institute for training and technical assistance (TTA) for the CNCS-funded asthma PFS feasibility cohort. As part of its TTA, the Urban Institute has developed an evaluation feasibility document to outline the approach, strengths, weaknesses, and special considerations for various evaluation designs.

Economic Feasibility

An assessment of the case for the business model, cost structure, revenue streams, economics on a unit basis, and assessment of scalability.

The purpose of the economic feasibility analysis is to determine if it is possible to develop a PFS transaction using projected underlying economics of the comprehensive asthma management program.

Key Takeaways

We have determined the project is economically feasible.

- The project is capable of stand-alone economic viability from the medical cost savings it generates for Health New England.
- We based this determination on finding possible scenarios in which the project generates positive economic returns.
- There are subpopulations that are viable economic investments.
- The target population is projected to generate positive returns and is of sufficient size to overcome transaction costs.
- Because the full set of Pay for Success services has not been implemented, there is no operational evidence that the integrated services will result in the actuarial-based economic projections.
- The ultimate project size may be subsequently affected by the project payment mechanism, choice of a final payer, and patient population they have access to.

GHHI Rating for Economic Feasibility: 3.75 / 5.0

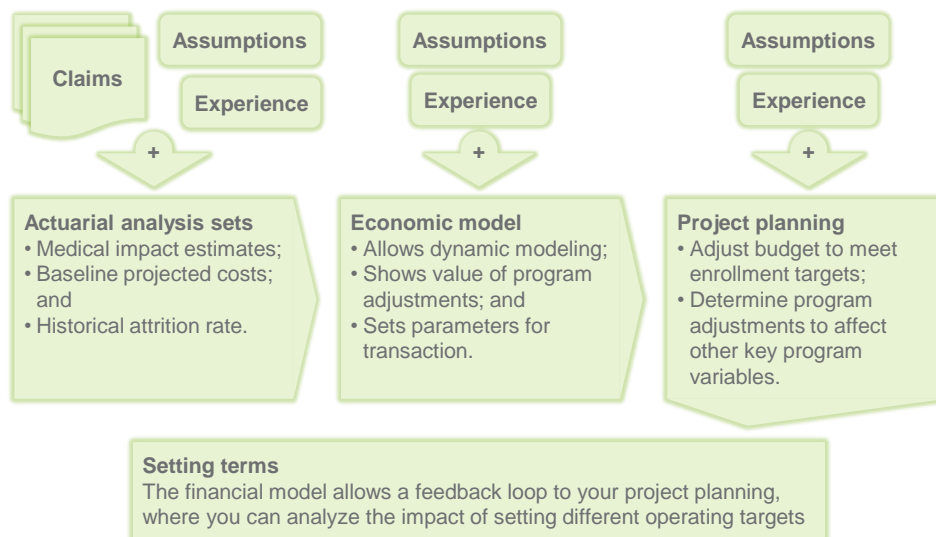
Process Overview

Our process was aimed at determining the parameters of economic viability for a Pay for Success transaction that used the value created by the intervention services. *Please see Exhibit 7.* The economic modeling was a result of three components:

- We used actuaries for projecting changes in medical utilization costs on a per unit basis, treated as value created;
- We leveraged existing programs as a historical baseline for service delivery costs, adjusted for locality and program specifics; and
- We identified reasonable estimates for transaction costs applied to the project.

Exhibit 7

Leveraging historical claims data and an actuarial analysis, we developed an economic model to guide project planning and term setting.



Source(s): GHHI

© www.ghhi.org

Using these three components, we created a dynamic economic model that allowed us to explore simulated scenarios to identify under what conditions a project would be viable. We then conducted an iterative process of project planning revisions to allow for the development of terms under which a project could be launched.

Actuarial Projections

We used actuarial projections to calculate medical utilization savings for the projects. To accomplish this, our health partners provided historical¹¹ claims data on the target population members.¹² The claims data set was sent to the actuarial firm, Milliman, for analysis to determine the current baseline of medical utilization and cost for the population. Milliman then utilized published studies, decades of experience working with asthma-related programs, interviews with industry experts and an analysis of services on the ground to project the potential future medical savings estimates for members enrolled in the comprehensive asthma intervention program.¹³ The actuarial assessment also determined the baseline¹⁴ for key project variables by subpopulation and annual enrollment cohorts including: target subpopulation size, attrition rates from the plan and marginal program impact per person by year of enrollment.

We then took the actuarial analysis and deconstructed it, generating per-unit per-year metrics for different subpopulations, and constructed an economic model that represented the program. This economic model was used to assess plausible scenarios given qualitative input and early-integrated program cost estimates from project partners. If these scenarios were able to cover both program and transaction costs, we made a determination of positive economic feasibility.

Service Budgeting

Projected budgets were used to establish the baseline for costs in providing services. Each service provider on a given project was provided with an overview of the GHHI services model operating in Baltimore for more than a decade, as well as comparative analysis of

¹¹ We typically aimed for a minimum of three years of data, though leveraged more where available. Due to the implementation of the Affordable Care Act, there was a substantial difference between data prior to three years and post three years' time, limiting the validity of deeper analysis.

¹² We used claims representing the total cost of care to the organization, with few minor exceptions.

¹³ Estimates of marginal program impact were based on the historical data provided, assessment by medical professionals of services rendered, and comprehensive research from programs including the Centers for Disease Control, National Institutes of Health and existing programs at the location. The projections were compared to an expected natural reversion to the mean for the population to determine the projected marginal impact of the intervention services.

¹⁴ The baseline included an assumption, validated in historical data, of rate of regression to the mean for each subpopulation over time.

the other sites by cost category. Each of those budgets was then adapted to local circumstances based on assessments of housing stock, cost adjustments for local prices and other factors.

Economic Modeling

We combined the projected cost savings and program costs to determine the net economic value for the program using a dynamic economic model. We used the financial industry's standard discounted cash flow analysis¹⁵ to assess economic value of the program. We did consider but did not explicitly include the effects of capital efficiency on the project's financial returns, as this would take place during formal negotiations or transaction structuring efforts.

Actuarial Findings

The actuarial findings for the project were based on our actuarial partner Milliman's analysis of claims data received from our health partners, described above. Milliman conducted an analysis using a software suite that analyzed claims data, established subpopulations and segmented costs into categories relevant to reductions in medical utilization. It then researched the existing body of literature¹⁶ and brought in experts to conduct an assessment of the programs in place at the site, ensuring that all the requirements of a well-functioning program were in place. After the program assessment, Milliman compiled a report with detailed exhibits that explained its analysis.

One substantial benefit of running a cohort was that we were able to rely on the rest of the cohort to fill in any particular data gaps that were apparent in the claims files. Springfield benefitted from this because Health New England came at risk for the target population in 2015, and lacked a history to base attrition rates on. The actuaries were able to draw upon a reference class of the entire cohort when processing the claims to determine baselines. We were also able to conduct a reference class analysis to broadly set rates.

¹⁵ We used discounted cash flow, internal rate of return and modified internal rate of return methods at differing points, relying on the net present values and internal rates of return for program reporting.

¹⁶ Or reference to appendices listing literature

Subpopulation Stratification

The project team, led by our health partner, developed a stratification strategy based on medical utilization that was both meaningful medically and would represent major cost-category tiers, each economically differentiated through an existing data element. Most sites determined that they would stratify the population into subpopulations based on a combination of a medical utilization event and accompanying diagnosis. Other criteria for selection were limitations based on geography, age, years under coverage, type of coverage, and others, depending on the specific site’s criteria and limitations.

Diagnosis:

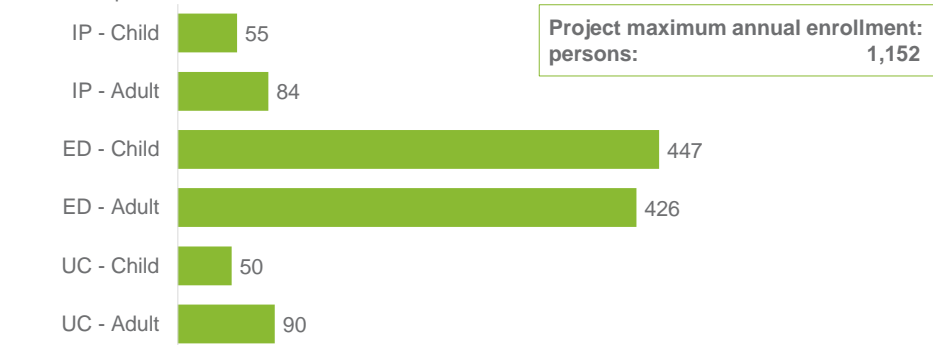
- Primary diagnosis of asthma, or
- A non-primary diagnosis of asthma with an accompanying primary diagnosis of a related condition.

Exhibit 8



The actuarial projections show a sufficient size to develop a project transaction.

Subpopulation maximum target population for enrollment



Summary findings from actuarial estimate
 Maximum size: 1,152 enrollees per year
 Maximum savings \$ 12.3 M over ten years of evaluation of three cohorts¹

Note(s): 1 Based on economic modeling of the actuarial findings.

Source(s): GHHI analysis of actuarial assessment and data provided by TennCare

Trigger events:

- An inpatient admission,
- An emergency visit, or
- An urgent care visit.

The Springfield site additionally included an analysis of their adult population, which was segmented separately from their Pediatric population. Other sites also looked at other measures, the most important of which was to include multiple tiers of high utilizers within a given subpopulation. For example, the average medical costs of any emergency department user with multiple visits was nearly double that of a party with only one visit. This had a proportionate impact on their savings potential.

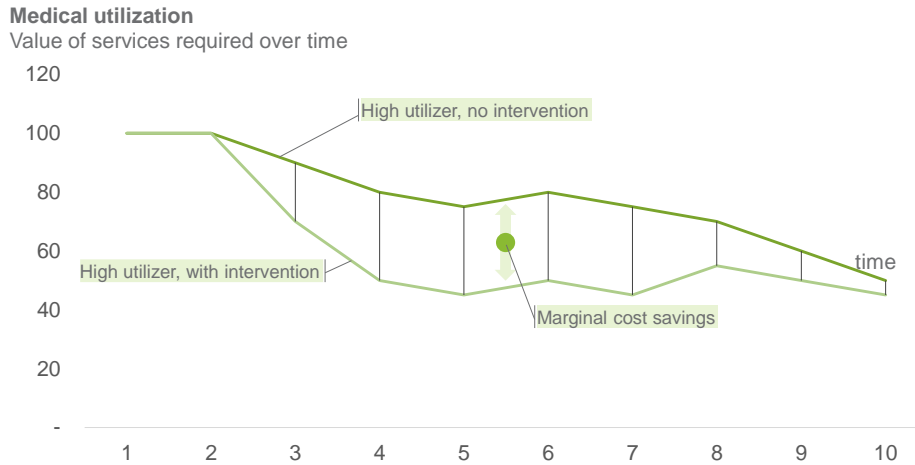
Marginal Effect Size

The marginal effect size was determined by creating projections of the course of medical utilization spending over the foreseeable project term for a population not receiving additional services, and comparing that to the expected utilization by a group that did receive the services. Please see Exhibit 9. This comparison generated a marginal impact on cost due to a reduction in medical utilization needs.

Exhibit 9



The actuarial analysis assumes that high utilizers would regress to a more normal population over time and calculates the effect from that baseline.



Note(s): * Example for one cost category of multiple analyzed.

Source(s): GHHI depiction of information from discussions with actuarial service provider

Attrition Rates

The actuaries were able to look at the subpopulations' trends over time to determine the net-effective¹⁷ attrition rate for populations over the term of the project. GHHI also conducted a reference class analysis using the composite of the five projects in this cohort by subpopulation for an additional reference point.

The actuarial assessment relied on a single attrition rate for project participants. We leveraged reference classes for individual subpopulations, the historical attrition rates at each of the sites for their subpopulations at the site, as well as differentials between reference classes and subpopulations, in an attempt to use the underlying data to triangulate the most likely outcome scenario.

Key issues for the attrition rate:

- During the actuarial analysis, Milliman reported credibility separately for the adult and pediatric populations:
 - The adult population was treated as 46 percent credible¹⁸ because they reached 9,949 member months of the requisite 48,000 they use as in internal threshold for credibility.
 - For the pediatric population, they treated the data with 36 percent credibility due to 6,432 member months present.
- In Springfield, Health New England did not have historical data beyond the prior year, limiting the ability to generate credible estimates for attrition. Milliman used a conservative assumption of 15 percent for estimates in their scenario.
- GHHI conducted a reference class analysis and identified median rates of 7.5 percent and 11.9 percent for the inpatient and emergency department subpopulations respectively.

¹⁷ The net-effective attrition rate represents the aggregate rate at which persons cease to be covered by the entity whose data we were working with, typically a health plan. The rate is inclusive of and agnostic to any reason someone would no longer be covered by the entity. It may include loss of eligibility, changing to another source of health insurance and other reasons.

¹⁸ Milliman does not detail what the statistical implication of this threshold was in statistical terms by, for example, defining a confidence interval or comparable technique to determine expected variations.

- GHHI also established a hypothesis that more severe medical needs would cause lower attrition rates for a number of reasons including:
 - High levels of financial reliance on Medicaid for healthcare needs, and
 - More interactions and more interaction time with medical providers leading to developing relationships they wish to preserve through maintaining coverage.

Service Delivery Budget

The cost of the program was based on budgetary projections from the specific site partners in combination with input from other service providers. Those estimates were based on historical data from their site, historical data as reference points from other sites nationally and extensive forward-looking estimates or projections of costs for the programs. Each site's budget is different and has been adapted from their existing service provision due to:

- Local housing stock and propensity to need differing services by severity,
- Local price adjustments for goods or services, and
- The specificity of the intervention to asthma prevention.

The process for determining the budget was extensive. It required establishing a baseline program design with initial estimates for costs, setting strategic budget targets related to program enrollments, conducting final iterative revisions to determine if meeting targets was possible and reassessing the project scope if necessary.

The baseline for program expense was established by using historical performance data and filling any gaps with information from across the cohort as well as from ongoing GHHI operations as a direct service provider in Baltimore.

After the actuarial analysis and initial economic modeling was completed, we were able to determine what the expected value of cost-savings for each of the subpopulations would

be. This allowed us to determine budgetary thresholds for inclusion of each of the sub-populations. For example, the required budget target was frequently too low to reliably deliver comprehensive services to the urgent care populations.

The final iterative revisions determined if there was a way to effectively deliver the comprehensive services at the target budget level. Frequently we relied on a reference class analysis of program cost categories from our cohort to identify outliers. This benchmarking allowed us to ensure that program costs were reasonable.

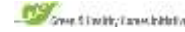
Budget considerations in Springfield

Springfield partners were able to draw upon organizational experience and resources from partners who have delivered home-based asthma interventions and related housing rehabilitations for several years. Pioneer Valley Asthma Coalition has extensive knowledge of asthma services models. Revitalize CDC and Springfield Office of Housing and have significant knowledge of the local housing stock and common environmental hazards.

Transaction Costs

While a Pay for Success project has many benefits, the transaction does have costs associated with it. GHHI initially priced what those costs would be, *please see Exhibit 10*. We believe that many of those costs could be brought down with economies of scale leveraged across our cohort and with potentially leveraging other institutions that are capable of playing or assuming substantial parts of other roles.

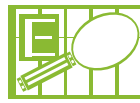
Exhibit 10



Transaction costs can vary widely depending on program design, though can sometimes be supported by foundations.



Contract and legal fees
Setting up the project including legal due-diligence.



Evaluation fees
Performing the ultimate evaluation of medical outcomes and communicating the results.



Intermediation fees
Providing services that include two components:

- Project management; and
- Financial intermediation.

Transaction cost type	High	Expected	Low
Origination	125,000	50,000	50,000
Evaluation	500,000	200,000	100,000
Program management*	750,000	200,000	100,000
Transaction management*	750,000	200,000	100,000
Total	2,125,000	650,000	350,000

Note(s): * A social impact investor could play the role of transaction manager and supervise a built-in project management capability for the project; however, an investor may want to see the foundation is invested in the project before they would be willing to agree.

Source(s): GHHI analysis of publicly available information.

© www.ghhi.org

We believe that transaction costs of originating these agreements will vary widely based on key factors:

- The number of parties involved in the transaction and the number of agreements they are each required to enter into;
- The availability of templates and legal precedent they can rely on to form the basis of their legal agreements; and
- The ability of the parties to leverage economies of scale by advancing any number of additional projects simultaneously.

Evaluation fees would also vary widely due to a number of factors. The bare minimum evaluation would be a specification of a comparison group for which the same actuarial analysis could be conducted on a recurring basis to determine if the appropriate marginal effect size is attained. More advanced and elaborate designs are also possible and would be substantially more capital intensive. In many cases, we would expect that if those substantively more expensive options were undertaken, they would need to be, at least, partially subsidized by a party seeking to accomplish a broader research agenda. Without that assistance, they would be economically burdensome on the project.

GHHI has worked with our site partners to ensure that strong project management capabilities have been built into each of the site’s program designs, which could dramatically reduce the reliance on outside project management needs, lowering the transaction costs substantially. This would be difficult, however, in cases where investors wanted an independent party to play a larger role for the purposes of risk mitigation.

Transaction management is the act of setting up and managing the special purpose vehicle or other entity that will fill the purpose of fiscal agency throughout the project. These fees will vary widely as well, depending on the party playing the role. While a traditional financial institution could play this role, a local foundation, community development financial institution, or similar entity could play the role requiring substantially less capital to do so.

We are actively working to reduce transactions costs for all of our sites, as they have been identified as one of the key economic inefficiencies of a Pay for Success project.

Site specific transaction cost considerations

The project team has been actively pursuing strategies to reduce the associated transaction costs for the project by internalizing project management costs and actively seeking local Community Development Corporations and Financial Institutions (CDC & CDFIs) to play active roles in the development of a transaction to ensure that they are minimized.

Model Composition

We took the projections of medical utilization savings, program costs and transaction costs and integrated them into a dynamic economic modeling tool by leveraging the following simplifying assumptions:

- Enrollments would be consistent on a monthly basis for 36 months;
- Attrition is a constant monthly effect over that time using statistical averages of the likely number of persons enrolled; and

- Program benefits accrue on a monthly basis at the rates projected by the actuarial analysis.¹⁹

The model first determines program enrollment using the above stated assumptions, the actuarial estimates of the target population, and the associated attrition²⁰ rates. We used incoming enrollments to trigger service costs and ongoing enrollments to calculate expected reductions in medical utilization. The result was a calculation of the direct program contribution for each subpopulation. We then added in the expected transaction costs, to determine the net economic value generated by the program in order to determine the economic viability of a PFS project.²¹

The project was modeled taking place over a 10-year term, *please see Exhibit 11 below*. While enrollments take place starting with the initiation of the project, there is a delay in the delivery of services to parties. One key consideration is that any person enrolled on the final day of the third year will receive their services over the course of the fourth year. Savings will be captured primarily in year five and beyond.

¹⁹ Their pay-out is a function of financial modeling to take place in transaction structuring and was not a focus of our analysis concerning the underlying economics.

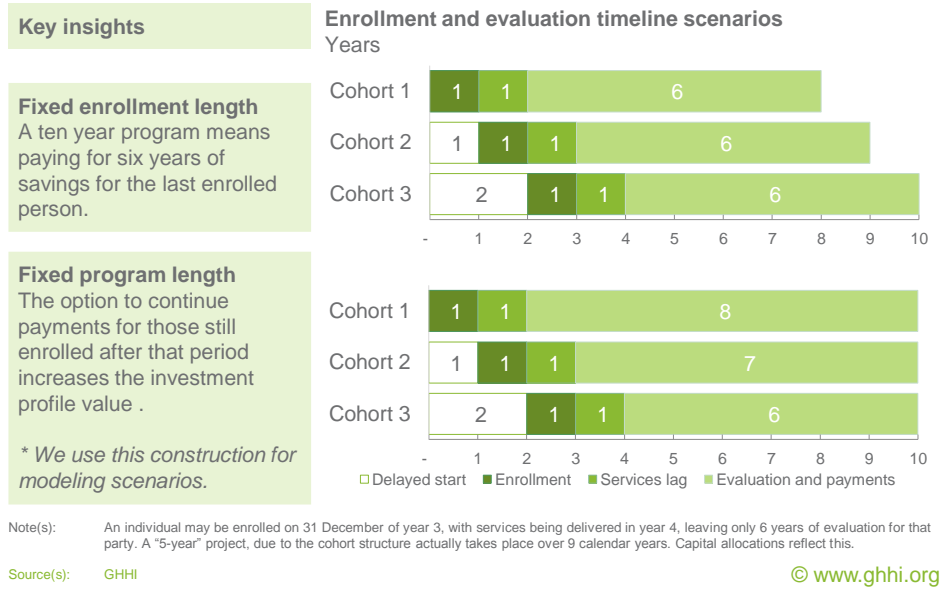
²⁰ Attrition as used was a net-effective projection of enrollment with the MCO. We used multiple assumptions for attrition ranging from the stated rate in actuarial assessment, using the actuarial assessment weighted for the enrollment percentages, as well as adjusting weighted rates for the expected program impact on housing stabilization, Medicaid re-enrollment improvements, as well as reductions in mortality. We were unable to project the potential impact of loss eligibility due to improvements in socio-economic status as a result of improvements in employment stability or other factors.

²¹ We acknowledge that a further analysis of the capital efficiency of the project would be necessary for any investor and we did conduct this analysis, but did not include it in the economic feasibility determination.

Exhibit 11



Different program structures will impact how long each party is evaluated and what payments are made to investors.



Economic Analysis

Our economic analysis was conducted to determine if there is a viable underlying net economic value for the program based on enrolling the different subpopulations. The process for this analysis was as follows:

- We first analyzed the subpopulations on a per-unit basis to determine if they were feasible for inclusion in a program and under what terms.
- Given the per-unit analysis, we turned to determining enrollments based on subpopulation inclusion and reasonable capture rates.
- We then moved to compose scenarios for an economically viable transaction that also met the requirements of the service partners.
- Finally, we stress tested these models through sensitivity analysis.

Subpopulation Findings

Each subpopulation was analyzed for their economic value on a per unit basis. Analysis showed that each subpopulation fell in one of the following three groups, *please see exhibit 12 for illustration:*

- A net benefit to the program above allocated fixed expenses, making it worthy of stand-alone investment;
- A contribution margin above variable costs, making that group economically viable for inclusion in a larger project; or
- Cost savings less than the variable cost of services, making that group applicable for some manner of subsidization.

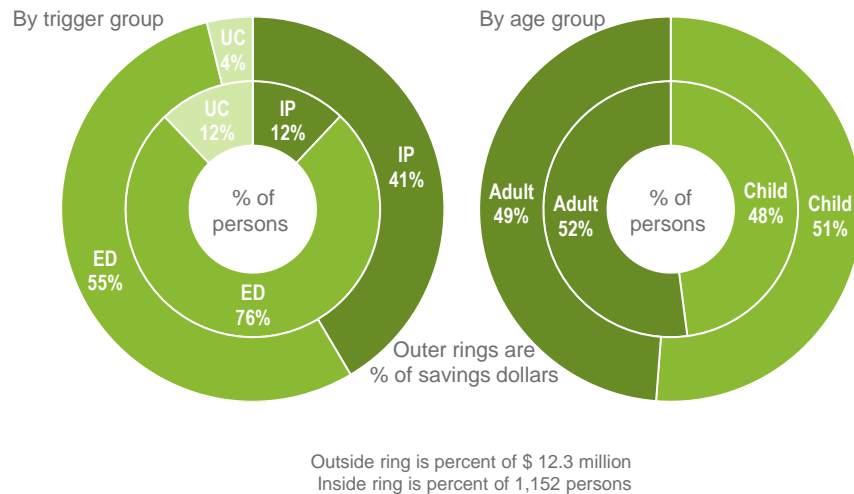
The presence of any one subpopulation warranting a stand-alone investment would have made the project economically viable, though perhaps not desirable given the potentially small size of such a program.

Exhibit 12

Different subpopulations have disproportionate savings potential, largely based on medical need.

Whole target population

Enrollment and savings by subpopulation



Source(s): GHFI analysis

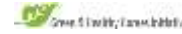
© www.ghfi.org | 12

As expected, the inpatient population is projected to generate disproportionate savings by comparison, generating 41 percent of possible dollars with only 12 percent of possible enrollees. The majority of project savings, 55 percent of dollars, were generated by the 76 percent of possible ED enrollees.

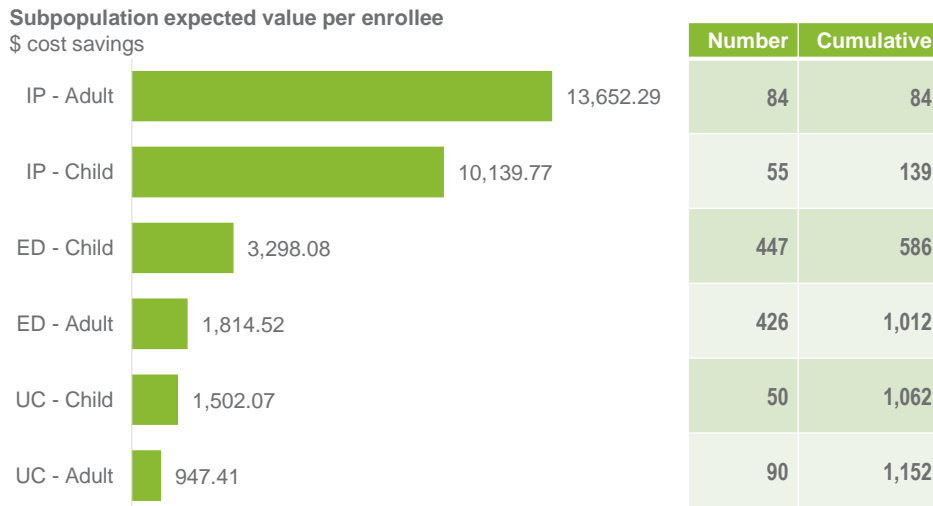
Despite having an expected larger marginal impact, the pediatric groups are expected to generate roughly the same savings as their counterparts in the adult groups, because the

adult groups had a higher baseline for expenses. This aligns with the existing body of research as adults are more likely to have comorbidities also requiring medical utilization, while being less affected by the services provided, the net result of which is nearly a perfect offset with adults comprising 52 percent of the population and generating 49 percent of the projected savings opportunity.

Exhibit 13



The per home budget estimate will determine which subpopulations are feasible for inclusion in the project, urgent care is economically not feasible.



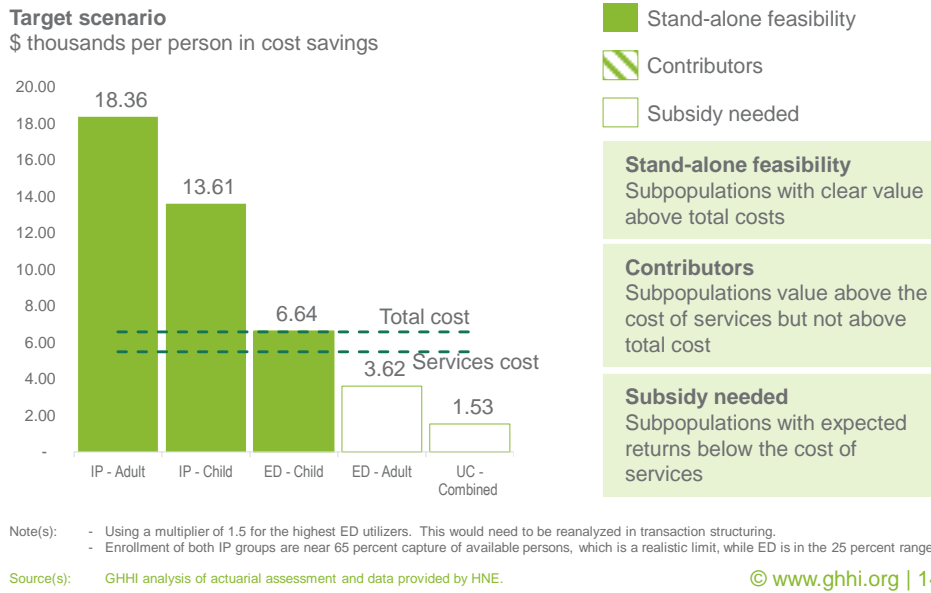
Note(s): * Assuming all actuarial assumptions a 10 percent net effective attrition rate, 36 equivalent monthly enrollments and 10 years of evaluation.
 Source(s): GHHI analysis of Milliman's actuarial assessment and other data provided by Baystate Health © www.ghhi.org | 13

In Springfield, the inpatient subpopulations were both projected to generate surplus economic value through enrollment in the program, while there were other considerations for the others. The urgent care group did not indicate sufficient savings potential to warrant a comprehensive intervention. The emergency department groups were more complex.

Exhibit 14



While the program is a test of real economics, we are limiting risk by focusing enrollment efforts on high-return subpopulations.



Our analysis of the emergency department subpopulations was more nuanced. We applied a multiplier of 1.5 times to the savings potential as a conservative estimate as the project team was only targeting reaching a maximum of 29 percent of the pediatric group and 6 percent of the adult group in the subpopulation. This additional targeting of persons based on medical need correlates highly to additional savings potential due to a higher base rate of medical utilization. We consider this multiplier to be reasonable and highly conservative for the adult population, which the top 6 percent of utilizers likely represent a substantially higher base-cost than 1.5 times their peers.

It would be a reasonable course of action to conduct an additional actuarial analysis to better understand the base-rate of medical utilization for this additional stratification, though it would need to be weighed against the additional costs during transaction structuring.

Transaction Composition

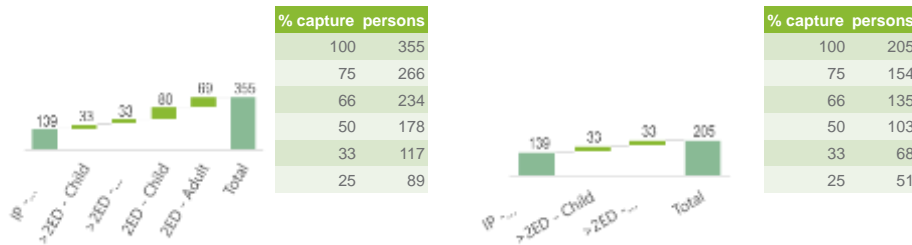
The purpose of transaction composition was to determine if there was overlap between a net-economic benefit for the program and the capacity limits of the program’s service providers. Our process was as followed:

- Survey of service providers for capacity limits, both upper and lower bound, when a project was too small to warrant the effort and the upper limit of what they could scale to in a reasonable timeframe;
- Identify reasonable capture rates²² for subpopulations, *please see Exhibit 15*; and
- Create scenarios for each including an additional subpopulation at a time, in order of economic²³ value.

Exhibit 15

Based on different capture rate scenarios, what subpopulation targets would be best to further analyze for inclusion in the project?

Project enrollments by subpopulations given differing enrollment criteria
 More than one ED visit More than two ED visits



Key questions:
 What enrollment criteria are appropriate economically and medically?

Enrollment scenarios including capture rate

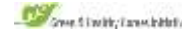
© www.ghhi.org | 15

In Springfield, there were both upper-bound and lower-bound limits on the project size. The project partners did not feel comfortable scaling the project beyond 600 persons in three years, focusing on ramping up the project over the service delivery period, *please see Exhibit 16*. As a result the first year will focus on enrolling primarily inpatient subpopulations, reaching a target of 160 persons, with only 75 emergency department enrollees

²² Capture rates measured the likelihood that a targeted person would enroll in the program once targeted.
²³ In our project, medial need was both a 1.0 correlation coefficient proxy for and took precedence over economic viability. In non-medial projects we would recommend using economic benefit as the primary decision-making criteria. We were fortunate that they were interchangeable on our projects.

from the pediatric population. The program will then ramp-up their enrollment from the multiple emergency department admission group, reaching a maximum target enrollment of 240 persons in the third year of services with 155 enrollees from the emergency department. The project team also explicitly left targets for the highest of the high-utilizing emergency department subpopulation, 10 slots in the second year and 25 in the third, to experiment with the group and their savings potential.

Exhibit 16



It is economically feasible to construct an Asthma Pay for Success project in Springfield, though other considerations need to be examined.

Year 1	Year 2	Year 3	Totals	
			\$ 5,753 K	Program cost savings
\$ 880 K	\$ 1,100 K	\$ 1,320 K	\$3,330 K	Intervention costs
			\$ 2,453 K	Program contribution
\$ 110 K	\$ 60 K	\$ 60 K	\$650 K	Transaction costs
			\$ 1,803 K	Net benefits
			12.46 %	Annual program Internal rate of return
160 (16%)	200 (20%)	240 (24%)	600 (20%)	Total persons per year (% capture)
35 (64%)	35 (64%)	35 (64%)	35 (64%)	IP – Child
75 (17%)	105 (23%)	130 (29%)	310 (23%)	ED – Child
50 (60%)	50 (60%)	50 (60%)	150 (60%)	IP – Adult
0 (00%)	10 (02%)	25 (06%)	35 (03%)	ED – Adult
			10.0 %	Net effective annual attrition rate
			\$(5,500)	Average cost per home budget

Note(s) * All scenarios omit any urgent care population.
 ** The scenario includes assuming a 1.5 time multiplier for ED trigger group cost savings for Medicaid groups by targeting high utilizers.

Source(s): GHHI analysis of actuarial assessment and data provided by Baystate Health.

© www.ghhi.org | 16

Potential Scenarios

Once the transaction composition was identified in terms of target enrollments, we turned to constructing possible scenarios for the program regarding variations in key program variables. The purpose of this exercise was to determine if there was at least one viable project design with enough surplus economic value over the program and transaction costs to warrant economic feasibility. In many cases we proposed multiple project designs to allow the partners to identify their strategic goals in running the program and to identify the design that was most likely to accomplish those goals. Further, we wanted to show the range of possible outcomes in addition to the target scenario, *please see Exhibit 17*.

The scenarios we considered were:

- **Conservative:** These scenarios looked at the downside risk for many project variables which could include: higher than expected attrition rates; budgetary overruns, and the possibility that changes in the Medicaid landscape could preclude the payer from participating beyond a certain year.
- **Target:** This scenario represented the expected and desired outcome for key variables in the project, relying on historical data and reference classes to establish expectations of the most likely outcome if the program meets operational goals.
- **Outperformance:** This scenario looks at the equally plausible case of exceeding performance expectations on a variety of key program variables.

Exhibit 17



It is economically feasible to construct an Asthma Pay for Success project in Springfield, though other considerations need to be examined.

Conservative	Target	Over-perform	Scenario names
\$ 4,265 K	\$ 5,753 K	\$ 6,368 K	Program cost savings
\$ 3,600 K	\$ 3,300 K	\$ 3,000 K	Intervention costs
\$ 665 K	\$ 2,453 K	\$ 3,368 K	Program contribution
\$ 530 K	\$ 650 K	\$ 650 K	Transaction costs
\$ 135 K	\$ 1,803 K	\$ 2,718 K	Net benefits
1.22 %	12.46 %	18.92 %	Annual program Internal rate of return
600 (20%)	600 (20%)	600 (20%)	Total persons over 3 years (percent capture)
35 (64%)	35 (64%)	35 (64%)	IP – Child
310 (23%)	310 (23%)	310 (23%)	ED – Child
150 (60%)	150 (60%)	150 (60%)	IP – Adult
35 (03%)	35 (03%)	35 (03%)	ED – Adult
Key assumptions			
**8	10	10	Years of evaluation (payments)
12.5 %	10.0 %	7.5 %	Net effective annual attrition rate
\$(6,000)	\$(5,500)	\$(5,000)	Average cost per home budget

Note(s) All scenarios a) omit any urgent care population, b) assume the actuarial projections for average cost savings per person, c) include an assumed multiplier of 1.5 times for ED trigger group cost savings for Medicaid groups by targeting high utilizers.

Source(s): GHII analysis of actuarial assessment and data provided by Baystate Health.

© www.ghii.org | 17

For the Springfield site, attrition rates are certainly the most uncertain variable. The data provided by Health New England was only for one calendar year, leaving assumptions based on actuarial experience and the claims data from other cohort sites as the only option. We did rely on our reference class analysis of all sites across the cohort as well as the Milliman estimates here and in other locations to determine what we consider a key assumption for the project modeling.

Discussion of Transaction Costs

The Springfield site has been highly conscientious of transaction costs throughout the feasibility study and have actively focused on ways to embed program management costs into the project as well as develop relationships with an ecosystem of local funders that could potentially provide fiscal agency for the project at rates comparable to program related investments, rather than as transaction management services offered. We have good reason to be highly optimistic that on balance the transaction cost burden will be managed downward from estimates, though present a standard assessment of transaction costs to ensure that they would not prevent the project from advancing. Their project is capable of sustaining a substantial economic burden from transaction costs.

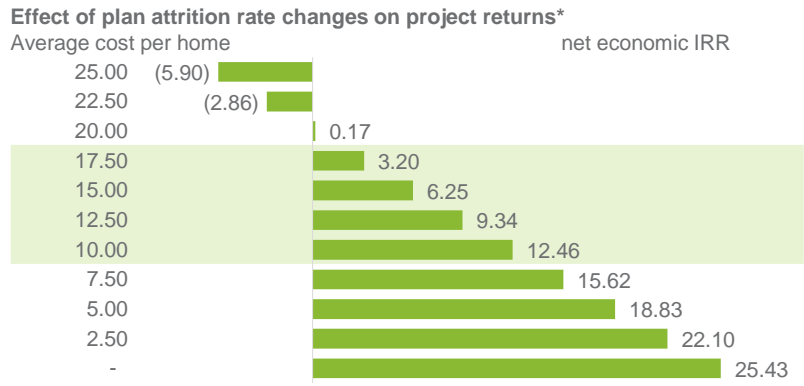
Sensitivity Analysis

After constructing scenarios, we conducted sensitivity analysis to show the likely program outcomes that result from variations among key project variables. The purpose of this exercise was to show the relative impact of different variables as well as the expected outcomes associated with the statistically likely ranges we observed in historical data, *please see Exhibit 18*.

Exhibit 18



Baystate’s plan attrition will determine how many years of savings can be collected and is a critical assumption for the project.



Importance
 The attrition rate affects how many years of cost savings will be captured for each person on average, based on their likelihood to leave the program.

Note(s): * Assuming the target scenario assumptions.
 - Goldman Sachs cost of capital was calculated at 3.83 as of 28 March 2016.
 - Our reference class analysis of attrition rates shows inpatient Medicaid populations with a median 7.5 percent net-effective annual attrition rate, while ED populations show 11.8 percent.

Source(s): GHHI analysis of actuarial assessment and data provided by Baystate Health © www.ghhi.org | 18

Need for Actuarial Analysis

We utilized an actuarial analysis specific to each project because it increased the rigor of analysis and coincided with the industry standards for public health, by using the very same actuarial standards used for determining the rates to be paid in managed care situations.

Dynamic Modeling

Our economic modeling relied on dynamic calculations, where altering one variable caused changes in others. For example, a change in enrollment capture rates might result in a lower aggregate program enrollment, lowering the number of homes, and raising the average price per home due to allocated fixed costs and volume purchasing losses. We developed a self-contained dynamic model so that the implications of any individual change for other variables was readily apparent.

Operational Feasibility

An assessment of the institutional capacity to implement the program, scale it effectively, and maintain operational excellence throughout.

The purpose of examining operational feasibility is to understand the strengths and weaknesses of the project team’s ability to successfully implement a coordinated intervention that combines services from multiple organizations at the scale likely required by the PFS project.

Key Takeaways

- Baystate Pulmonary Rehabilitation’s community health worker model provides a strong base for the Springfield service provider team.
- Partners for a Healthier Community, (PHC) as a “backbone” institution, has strong project management, data analysis, and evaluation capacity.
- Housing service providers, though lacking asthma-specific remediation experience, have the capacity and flexibility to serve PFS enrollees.
- A pilot would help the team refine referral and data management process, as well as hone expectations for the prevalence of asthma triggers in the home.

GHHI Rating for Operational Feasibility: 3.0 / 5.0

History and Relationships

Track Record for Separate Services

Although the project partners have limited experience in working together on a single, coordinated service delivery model, each organization has a strong track record of delivering services that are either directly or somewhat related to those planned for the PFS intervention. There is also a track record of community support for similar asthma initiatives, which provide a strong basis for moving this project forward.

In 2013 the Pioneer Valley Asthma Coalition (PVAC), convened by PHC, collaborated with Baystate High Street Pediatric Health Center and other partners to implement a CMS Innovation grant for asthma home visiting, called Reducing Ethnic/Racial Asthma Disparities in Youth (READY). The READY study included multiple home visits by a CHW to address environmental and behavioral factors contributing to uncontrolled asthma. READY served 225 asthma patients and demonstrated substantial decrease in medical utilization, including 33.6% decrease in ED visits, 23.1% decrease in hospitalizations.

Previously, from 2008 to 2011, PVAC and Baystate performed a pilot asthma home visiting program, also CHW-led, which served 40 families. The pilot shows improved outcomes related to asthma control test (ACT) scores and commitment from families to continue to maintain a home environment with minimal asthma triggers. Other similar pilot projects include PVAC's Older Adult Asthma Home Visiting program, which provided home visits and supplies to 39 patients.

Revitalize CDC, a lead housing service provider for the PFS intervention, is a former Rebuilding Together site that has years of performing extensive home repairs, including whole-house rehabilitations. Between 2012 and the beginning of this project, Revitalize had performed home repair and modification services to 165 homes. The Springfield Office of Housing oversees a variety of services supported by local, state, and federal resources. Current programs include emergency home repair, heating system repair/replacement, and new home development. Current Office of Housing staff administered the

Neighborhood Stabilization Program in 2009-2015, which included whole-house rehabilitation.

Track Record for Combined Services

Each service provider organization has an impressive track record of delivering services that will be incorporated into the coordinated PFS intervention. While service provider organizations do have experience in referring clients to one another for certain housing repair needs, the partners have not yet coordinated service delivery to the extent that will be required under the PFS project. Performing a pilot phase of the PFS intervention would greatly benefit the team in understanding how referrals, communication, and data management should occur between organizations for a seamless service delivery. The team has already begun to secure funding for this pilot phase and expects to begin enrolling patients into the pilot this fall 2016.

PFS Service Delivery Plans

Roles and Responsibilities

There are several key staff positions at each organization that will ensure a successful delivery of services. PHC will be the backbone service provider and coordinate the overall service delivery between housing service provider teams. The PHC team will consist of a Project Manager, Data Manager, Director of Research & Evaluation, and Project Assistant. Revitalize CDC and the City of Springfield, as housing service providers, will each have a full-time Assessor/Project Manager who will be responsible for assessing homes, writing Scopes of Work, managing contractors, and coordinating with PHC.

Baystate's Pulmonary Rehabilitation department will act as service provider for healthcare-related aspects of the intervention, including care management, education, and provision of patient supplies like hypo-allergenic mattress and pillow covers. The Baystate team will consist of a team of Community Health Workers (CHWs), a Transitional Care Coordinator who supervises and coordinates the CHWs, and an overall administrative manager of the program. An outstanding question related to the Baystate team is to what extent the Transitional Care Coordinator (TCC) will be devoted to the PFS

project specifically. Baystate projects that 0.8 FTE should be adequate, but a pilot should provide further insight into this estimate. Additionally, Baystate has budgeted three to four full time CHWs for the PFS project based on experience with caseloads of similar programs. This is also an estimate that may be refined through running a pilot.

Enrollments

One key consideration for the service delivery design (and a current component of READY) is the ability of the Baystate TCC to identify and enroll high-utilizing asthma patients as soon as they enter the hospital. Because enrollment rate of the highest utilizing asthma patients (especially inpatient enrollees) is crucial to the economic viability of the project, it is important that this enrollment process is completed as quickly and as close to the asthma event as possible. The team has discussed the importance of a “warm referral” when possible; a pilot phase should assist with refining this process.

Process Flow

The team’s process flow deliverables are well developed. Each deliverable clearly outline the steps that Baystate, PHC, and housing service providers will take in serving an enrolled asthma patient. The process flow diagram, shown in the exhibit below, provides a visual representation of how the team will perform a specific set of services given a patient's risk level and a home's tier level. The process flow narrative provides additional detail for each step shown, and highlights the roles and responsibilities for each staff member involved.

The process begins with patient identification and enrollment by Baystate Pulmonary Rehab. The BPR Transitional Care Coordinator then sets up the first home visit for baseline intake. A second home visit will be coordinated between the CHW and housing assessor. From this point forward, the PHC project manager oversees the coordination of CHW visits and home repair visits until final quality checks are complete.

is in the midst of developing plans for the pilot. We expect piloting to commence in the fall of 2016.

Scaling Capacity

Current Scale

The service providers currently do not perform asthma-focused services like those planned for the PFS intervention, but some of the partners have provided other housing related services at scale. From 2012 to the beginning of this feasibility project, Revitalize performed a total of 165 home repairs at an average cost of \$6,667 per home. The City of Springfield completes emergency repairs, including roof replacements, on 20-30 homes per year, and repair/replaces hundreds of heating systems per year. HUD has awarded the Office of Housing \$4.5 million to implement a Health Homes Rehabilitation Program, which will begin operation in 2017. The Baystate Pulmonary Rehabilitation does not have an asthma home visiting practice in place, but will draw upon the experience of Baystate High Street Health Center Pediatrics from its READY program in which the program served 225 patients.

Scaling Plans

After analyzing the economic model projections, the team decided on a scaling plan of serving 160 patients in year 1, 200 patients in year 2, and 240 patients in year 3. A gradual ramp-up from year 1 to 3 should provide the team enough time to become familiar with the intervention process and serve patients more efficiently over time. The pilot phase prior to PFS implementation should also assist with managing the early learning curve.

There are a number of new staff positions that would need to be added prior to project implementation; housing assessors and CHWs are new positions and require specific training to perform their specific roles. Revitalize CDC plans to add its housing assessor during the pilot. The Office of Housing plans to add its housing assessor in 2017 as part of its Healthy Homes Rehabilitation Program.

While potential funders may be concerned with the lack of experience in delivering PFS services at the planned scale, a robust pilot phase should help mitigate some of these apprehensions. The team will therefore be focused on the design and implementation of these pilots in the coming months.

Project Management Capacity

PHC, the overall project manager for the PFS intervention, has a solid history of managing similar initiatives in the past. As a key convener of numerous community ventures, PHC is uniquely qualified to be project manager for multiple service provider groups. PHC has managed several state- local- and philanthropy-funded grants including projects supported by the EPA and Massachusetts Department of Public Health.

Sarita Hudson, who will be the PFS Project Manager, has over 30 years of managing health, social service and community programs and has extensive experience with grant implementation, budgeting, evaluation, and reporting. For the past 4 years, she has been the Manager of the Pioneer Valley Asthma Coalition, overseeing its efforts to improve asthma management and indoor environment in schools and homes. She oversaw the MDPH Asthma Disparities and EPA Indoor Air Quality grants, which included creating infrastructure and systems change to improve asthma management and IAQ in schools.²⁴

²⁴ From PHC proposal, April 2015.

Sociopolitical Feasibility

An assessment of the stakeholder ecosystem and its ability to affect project outcomes.

The purpose of assessing sociopolitical feasibility is to determine whether a supportive stakeholder ecosystem exists for the project. Even if the project team is able to successfully control internal parameters of the project, external parties play an important role in project implementation.

It is important to note that we have separated regulatory issues related to the PFS payment mechanism from sociopolitical feasibility in order to maintain focus on the political and community aspects. To determine the project's sociopolitical feasibility, we assess the extent to which the team has explored potential internal and external parties who may influence project success as well as the clarity in which key stakeholders and issues have been identified. To facilitate this, as part of our technical assistance service for stakeholder analysis and engagement, we created a workbook for the team to document key stakeholders and implement an engagement strategy throughout the project.

Key Takeaways

- The Springfield team has a strong local network and has demonstrated the ability to identify and successfully engage key stakeholders.
- The Springfield local leads have successfully engaged senior executives on the healthcare and service provider side and secured support.
- Massachusetts is a fruitful setting for innovation and Pay for Success, with a state law passed to facilitate PFS and a launched transaction in Boston.

GHHI Rating for Sociopolitical Feasibility: 4.0 / 5.0

Local Context and Appetite for Innovation

Massachusetts is one of the nation's hubs for Pay for Success. In 2012, the state announced a first-in-the nation initiative to allow Massachusetts to enter into PFS contracts through the legislative authorization of the Social Innovation Financing Trust Fund. The fund allows the Secretary of Administration and Finance to enter into up to \$50 million in pay for success contracts, backed by the full faith and credit of the Commonwealth. Two PFS projects have been launched in the Commonwealth, one addressing juvenile justice and the other addressing chronic homelessness.

In addition to the PFS activity, Baystate and the Commonwealth itself has shown significant willingness to innovate in the healthcare space. Baystate has implemented alternative payment models and viewed the PFS opportunity as aligned with the shift away from fee for service. Massachusetts has received approval of an 1115 Waiver from CMS that includes delivery system reform for its Medicaid program and an emphasis on ACOs partnering with community-based providers.

Internal and External Key Stakeholders

Analysis

Through the Technical Assistance #9 work stream, *Stakeholder Analysis*, the team began to identify stakeholder groups and issues that are key to the project's success. It is important to gain the support of local and national stakeholder groups in the event that the project receives criticism around aspects like evaluation design or payment terms.

The Springfield team has strong support from key internal stakeholders at the various entities of Baystate and PHC. Each organization has designated executive sponsors of the PFS project who are updated regularly. They have identified all who will be involved in the final decision on whether to pursue a PFS transaction or not and appropriately educated and updated those individuals as well. Members of the president's cabinet at Baystate and the Executive Director of PHC have been briefed on the feasibility analysis and underlying economics of the PFS project.

Key external stakeholders include other housing providers that could leverage their resources, potential funders including philanthropy and community development financial institutions, political leaders, state Medicaid leaders, and other PFS-related organizations like Social Finance. The Springfield team has strong relationships within the healthcare and social service community. The team has identified many other key external stakeholders in the community who may become involved at a later point to plan for a broader impact study.

Engagement

Throughout the feasibility study, the Springfield team engaged multiple stakeholders. One key stakeholder, the Springfield Office of Housing, was initially not part of the service provider team, but upon engagement and learning more about the PFS project roles, committed to being part of the housing service provider team.

PVAC has a strong network of asthma stakeholders throughout the local area. With EPA support, PVAC has established and has developed a healthy homes partnership. Project partners provided updates to other asthma programs throughout New England, who provide similar services to the PFS design in Springfield.

A group of potential funding partners and other community stakeholders were briefed on the project and its underlying economics in late July.

The engagement with MassHealth has been minimal to date, but the Springfield team has set a meeting with the Massachusetts Secretary of Health in the upcoming months.

Payment Mechanism Feasibility

An assessment of the stakeholder ecosystem including key legal issues, political partners, policy or regulatory issues, and other related potential obstacles to project success.

To enter into any Pay for Success transaction, the payment mechanism must be clearly articulated and ready for use. An additional consideration in our projects, beyond working generally in public health, is that additional regulatory approvals are required to use Medicaid funds, including both the State office as well as federal CMS. There is a need for the state to ensure Federal Payment Participation (FPP) and the healthcare partner needs to ensure that the state will allow the use of funds to ensure that they can be reimbursed.

Key Takeaways

We have determined it feasible to create a workable payment mechanism.

- The project is designed with strategic ambiguity to allow an MCO or ACO to be the ultimate end-payer, which we have support of and for by Baystate Health. Either could leverage several options to ensure commensurate compensation.
- Engagement with MassHealth has been limited, but local representatives are supportive, the state has issued legislation for and established multiple Pay for Success projects to date. Further, the partners have met with a representative who will set a meeting with the Secretary of Health to advance the project.
- Many constituencies in the local community have been highly supportive and actively contributed to problem-solving exercises to develop the appropriate fiscal agency infrastructure for the project.

GHHI Rating for Payment Mechanism Feasibility: 3.0 / 5.0

Payment Mechanism Challenge in Medicaid

A key issue for each of the projects will be the relationship between the parties and the allocation of net economic benefits generated by the home-based interventions. Payments from Medicaid programs to the project's managed care organization are currently based on historically calculated rates for a population's total cost of medical care. Payment rates are periodically readjusted based on recent changes in the population's cost of medical care. If this project reduces the total cost of medical care for the target population, which is the stated purpose of the project, then at the next rate adjustment the population's rate will be adjusted downward.

If the population's calculated cost of medical care rate is adjusted downward, then the future benefits of the program will be entirely allocated to Medicaid, leaving the other parties with no long-term financial incentive to undertake the project. More importantly, there will be no long-term incentive to change the method of care delivery to include home-based interventions. GHHI is currently working with experts in the Medicaid field to refine recommendations to address this issue.

A secondary issue is that services beyond the traditional continuum of medical care are typically designated as non-medical services, such as home-based interventions. They may be omitted from the calculation of medical cost rates despite providing medical utility. Without a mechanism that allows organizations to include these services in their rate calculations, they will be penalized for providing preventive services that improve the medical outcomes for their patients during the rate-setting process.

For each site in the cohort, we leveraged the expertise of our contracted healthcare policy advisor, Health Management Associates (HMA), to explore the state Medicaid environment and readiness for PFS projects that would potentially use state Medicaid dollars for success payments.

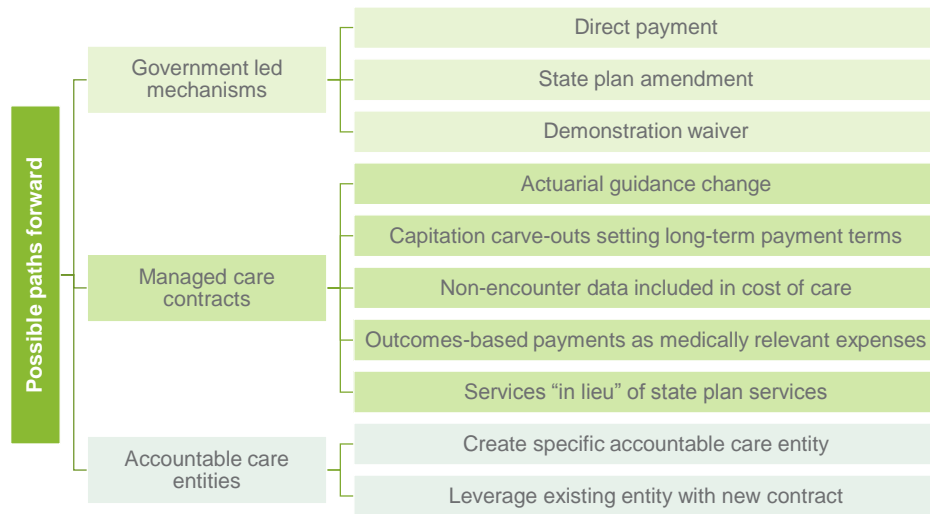
Payment Mechanism Options and Viability

There are a number of payment mechanisms available to resolve any issues. Each of them ensures that the health partner is capable of entering into an agreement for the Pay for Success transaction that does not adversely affect them. The majority of mechanisms leverage an outcomes-based payment and seek differing methods of ensuring that those payments fall under a regulatory mechanism that allows for Federal Payment participation.

Exhibit 20



We have a roadmap of possible solutions that we plan on pursuing and we are continuing to evaluate them in the context of each state.



Source(s): GHHI analysis of publicly available information

© www.ghhi.org | 20

This area is highly technical and constantly shifting as we continue our engagement with industry practitioners, experts, and regulatory authorities. To date a key question is whether a managed care provider contract will include an outcomes based payment or whether an external party will be set up to administer the program. Secondly, which mechanism will be used to ensure consistent payments. For more information as to the current ever-shifting possibilities by jurisdiction, *please contact pfs@ghhi.org.*

Site-Specific Background

We believe that the payment mechanism in Massachusetts can be established, with the participation of MassHealth, despite an ongoing focus on a Delivery System Reform Incentive Program (DSRIP) being the single most-important key issue. Other key issues for the site-specific payment mechanism:

- Baystate Health's committed project leadership provides them purview over a variety of health-system entities that can play the role of payer in a Pay for Success project. In addition, they have verbally committed to advancing the project even if another organization's ACO ultimately plays the role of an end-payer, with Baystate treating it as an investment in public health.
- We are confident that the project can be advanced and are in discussions with state legislators to have the program advance through the Executive Office of Health and Human Services for the State of Massachusetts, and then gaining CMS commitment.
- The development of local infrastructure to ensure fiscal agency was initially a concern, but we have engaged in a number of discussions that indicate it will be substantially easier to garner local support for the project than originally considered.

Massachusetts has existing accountable and managed care providers, allowing those entities substantial autonomy in caring for the populations, though specific issues require special consideration to allow a Pay for Success arrangement to work. MassHealth, the program running Medicaid for Massachusetts, has undertaken a DSRIP program, a substantial undertaking. We see this as a highly complementary program, though intense focus on it could prove problematic to advancing other issues.

GHHI is in the process of working with our site partners to investigate how the Pay for Success project at hand could integrate with the DSRIP program in Massachusetts. At this time, we are unaware of any reason why the project could not be advanced in this manner or through other more specific means.

We have not directly discussed the program with the appropriate parties at MassHealth, although partners are setting up a meeting with the Executive Office of Health and Human Services for the State of Massachusetts.

There is already a strong community of support for asthma projects in the region, many focused on standing up home-visiting programs and ensuring their medical appropriateness. Health Resources in Action was recognized with the National Environmental Leadership in Asthma Management Award for its New England Asthma Innovation Collaborative (NEIAC), supported by a grant from the Centers for Medicare and Medicaid Innovation (CMMI). Springfield is a NEIAC site. Those efforts have made wonderful progress and we hope to build on these efforts using Pay for Success to capitalize the project in Springfield.

The Massachusetts DSRIP program will seek to transform the service delivery model for the State. This effort, being such a substantial undertaking so directly related to the ongoing work of the Pay for Success project, is a key issue for consideration. Simultaneously, it represents a major investment in finding new models of improving the quality of care and reducing the cost of delivering services as well as a large, labor and cost-intensive project that could result in other initiatives falling by the wayside. We are confident that we could structure our PFS project to fit within the DSRIP effort or gain appropriate independent commitments to allow it to further those aims as a separate but related demonstration of the value of preventative care.

One potential hurdle is a broadly characterized uncertainty about the future of risk within public health. We feel strongly that they can be addressed in the Pay for Success agreements through a number of mechanisms. Such possibilities include:

- Securing a commitment from a foundation to guarantee against specific types of losses for the program;
- Finding a group of funders that are comfortable with the risk; or
- Securing a commitment from the state that in the event of such a major transition, a net of present values payout for future savings would be warranted.

While none of these options have currently been secured, in theory they are all applicable and could effectively limit or manage the risk of such events.

The community in Springfield includes local financial institutions that are or have the ability to ensure appropriate fiscal agency, especially if in concert with an outside party providing content specific project management capabilities, which GHHI, community partners, or another organization can do.

We have every reason to believe that a local fiscal agency relationship can be established to ensure investor repayment and transfer of cash-flows. The project partners are actively looking to create an infrastructure capable of supporting future initiatives.

Capital Availability

An analysis of the market for investment or backing of the project.

Capital availability includes the assessment of potential funding sources at a national and local level for this project were it to progress into transaction structuring phase. Social Finance, a close partner on this project, leveraged their knowledge and expertise of the investment landscape to gauge potential interest from investors and funders to support the project.

Key Takeaways

- National-level funding is a strong possibility in Springfield given the level of PFS activity across the state and in Boston.
- Local-level funding is also a strong possibility; team partners have robust relationships with local funding groups and have already held informational meetings about this project.

GHHI Rating for Capital Availability: 4.75 / 5.0

Investor Inventory

For Technical Assistance #7-Investor Inventory, we partnered with Social Finance to leverage their knowledge of the PFS field and experience in raising capital with national and local funders. Social Finance produced an inventory of potential commercial and philanthropic funders for each of our cohort sites, prioritized by those who demonstrate a high likelihood of funding asthma-based PFS projects. The inventory is a starting point for sites when they feel ready to engage high-potential funders for outreach and education.

In the inventory, Social Finance looked at different types of investors and analyzed their potential interest with a methodology that addressed programmatic requirements, geographic mandate, and historical size of investments. The analysis included for-profit banks and companies, philanthropic organizations, community development finance institutions (CDFIs), and other types of investors such as high net worth individuals. The organizations were organized into high, medium, and low priority based on their alignment with the criteria.

National Landscape

Pay for Success is still a young and developing field within the broader impact investment sector. Since the inception of PFS in the United States in 2012, there have only been 11 launched projects, representing over 130 million dollars in investment. Of those projects that have already launched, there is a diverse collection of national funders that are involved at different levels of investment and financial backing. We have seen national funders emerge from the commercial banking sector, community development institutions, and philanthropy. When looking outside of those active funders, there are a number of additional national funding institutions who have demonstrated support for the field but have not yet provided financing to an active project. We have seen and heard of strong interest from national funding groups, and we are optimistic that feasible projects will have access to the capital they need to launch.

Local Landscape

The Springfield team has robust existing relationships with local funders who have provided past and current grants. Frank Robinson of Baystate has strong working relationships with a number of funder groups locally. In July he set up a meeting with funding

workshop with Common Capital, United Way, HAP Housing, the Community Foundation, and the Davis Foundation to present preliminary feasibility findings of the project. Representatives from these funding groups expressed enthusiasm and great interest in providing upfront funding for the PFS project.

As we continue our work in securing the payment mechanism and building out a pilot phase, we will continue to keep these funders apprised of our activities. Based on conversations that we have been a part of, we are highly confident that local funding for upfront investment is available and ready to engage.

Analysis and Discussion of Alternatives

An analysis and discussion of post-feasibility alternatives to Pay for Success.

As part of conducting the feasibility assessment, the GHHI team analyzed a number of scenarios during each project. The comparative analysis of these scenarios served to highlight the strengths and weaknesses of each approach. The scenarios included variations within a Pay for Success project as well as alternatives to the Pay for Success model such as options to discontinue efforts, to directly fund the services, and others.

Alternative options to moving a Pay for Success transaction forward include:

- Maintain status quo and do not pursue additional program activities;
- Funding of services without Pay for Success;
- Funding of services at the state level without federal participation;
- Reimbursement for all or a subset of services

Maintain Status Quo

Baystate Pulmonary Rehabilitation (BPR) provides clinical services to their patients. If patients have home-based needs that would improve their asthma management, they have to find and secure these services on their own, or the BPR clinicians could refer them to local service providers. The current resources for environmental home services are limited, with the Center for Medicare and Medicaid Innovation grant having ended in 2015. Springfield does not have a HUD grant for lead and healthy homes, but a limited number of homes may be eligible for rehabilitation through CDBG or CDBG-Disaster Resiliency funds managed by the Office of Housing. The baseline for the actuarial projections are reflective of the status quo in service delivery and resources, so we would expect the long term healthcare needs and costs of HNE members to increase.

Funding of Services without Pay for Success

The guidelines-based environmental home services currently are outside of the normal payment mechanism for medically related services. CPT codes that correspond to removing carpet in an asthmatic's bedroom do not exist, for example. These services could be

funded through other Baystate resources or discretionary funds. This model does allow Baystate substantially more autonomy in their program administration because they would not have to contractually commit to meeting any program requirements. There are limitations associated with direct purchase of services, however. Baystate would bear the financial risk for medical outcomes improvements. PHC, Revitalize CDC, and the Office of Housing would not have an initial capital raise to allow for expansion to serve a larger population than they are currently able to. Based on the capitation structure between HNE and State Medicaid, there is a disincentive to investing in preventive services that would lower medical utilization, and subsequently lower compensation from the state to HNE.

Funding of Services at State Level

The Commonwealth of Massachusetts could decide to fund these services through the state budget and/or through the non-federal portion of the state Medicaid budget. This would allow these services to be available to all Medicaid members who meet the program eligibility requirements. Allocating these resources would require legislative action as well as analysis to determine if there were programs that could deliver these type of services throughout the state. The funding would also be outside of the federal participation that is allocated towards approved Medicaid spending by the State.

Reimbursement for All or a Subset of Services

Long term, our collective goal is to have these services included as part of a standard of care for asthmatics, with reimbursements and payments in the same structure as traditional medical services and medications. For some of the services, such as home education provided by health navigators or community health workers, a State Plan Amendment would have to be negotiated between MassHealth and CMS. The amendment is a long process that the state would have to assign resources to complete with the federal government. For more structural or environmental services, either regulatory changes at the federal level would need to occur, or the state would have to apply for a waiver from CMS to provide services that are outside of the state plan. The waiver process may be

time-consuming, and the waiver would only be approved for a certain set of years. Massachusetts was awarded a waiver around additional services for asthma high utilizers in 2013, but the services were never implemented. Our health policy partners Health Management Associates communicated that in their discussions with MassHealth, the state does not anticipate implementation of the 2013 waiver, in light of the other large scale 1115 waiver MassHealth has developed.

Conclusion and Final Recommendations

Final recommendation of next steps.

GHHI has determined that an asthma-focused Pay for Success transaction with Baystate Health and Partners for a Healthier Community, Revitalize CDC, and Springfield Office of Housing is highly feasible and recommends transitioning to the transaction structuring phase. We also recommend launching a pilot to test processes service delivery assumptions, and data management capacity.

The Springfield Asthma PFS plans are built on a strong partnership that has a demonstrated ability to create, iterate, and test solutions. The planned intervention is rooted in evidence and aligned with current asthma guidelines. Evidence to date and actuarial projections indicate that Health New England (Baystate MCO) is likely to realize cost savings and plans are in place to study the broader societal impact of the intervention. Massachusetts is a promising setting for innovation and key stakeholders are proactively supportive.

As indicated in the *Payment Mechanism* section, the issues related to Medicaid contracting are the primary challenges at this point and GHHI is continuing its work with Baystate and other partners around the country to develop solutions at the federal and state levels. While there has been limited engagement with MassHealth, there is an upcoming meeting between the Springfield Asthma PFS partners and the Executive Office of Health and Human Services. The Massachusetts 1115 waiver may bring about changes in the payer profile in the state that would materially change who would be at risk for the PFS project's target population.

Upon discussing GHHI's feasibility findings, the Springfield team has decided to proceed with launching a pilot and advancing towards a Pay for Success transaction. Partners believe that the outstanding questions on MassHealth payer structure will be resolved in the same period as the pilot is completed.

GHHI will continue to provide technical assistance in this post-feasibility phase and recommends the following next steps:

- GHHI to develop a post-feasibility work plan with the team.
- Project partners to engage with MassHealth to determine how to advance the evidence-based comprehensive asthma intervention services in a manner that works for all parties.
- Partners for a Healthier Community, Baystate Pulmonary Rehabilitation, Revitalize CDC, and Springfield Office of Housing conduct a pilot to test the service delivery process, the budgetary assumptions, and the data management plan.
- Team to initiate outreach to potential evaluators and continue engagement with potential funders to formally begin transaction structuring phase.

These steps will help maintain momentum and improve the overall feasibility so that the project will have a higher likelihood of successfully advancing towards launch. A small pilot will allow the team to test plans and refine the service delivery model, which will improve operational and economic feasibility. More substantial engagement of MassHealth will improve sociopolitical and payment mechanism feasibility.

Notes

The information contained or incorporated by reference in this document includes forward-looking statements. We have in the past and may in the future make forward-looking statements orally to analysts, investors, the media, and others. Forward-looking statements are statements that are not historical facts. The information contained or incorporated by reference in this document to forward looking statements may include:

- The effectiveness of services provided by GHHI, its partners, or other parties;
- Our collective proposed strategy and ability to deliver the services described to generate cost savings from services delivered;
- The effectiveness of our marketing programs;
- Competition from existing and new competitors in our market, and our ability to compete with such competitors;
- Potential future growth of revenues, the rate of that growth and the effect of that growth on our operating margin;
- Anticipated fluctuations in our revenues and cost of revenues;
- Anticipated compensation, related charges, and our effective tax rate;
- Anticipated trends in our industry, local market, and other areas of impact;
- Anticipated effects of potential acquisitions, divestitures, and other transactions;
- Future capital needs and capital expenditures; and
- The impact of current litigation in which we are involved.

Additional forward-looking statements are identified in the documents incorporated herein by reference. These forward-looking statements are based on current expectations, estimates and projections about industries, management's beliefs, and certain assumptions made by management. Words such as "anticipates", "expects", "intends", "plans", "believes", "seeks", "estimates" and similar expressions are intended to identify forward-looking statements.

There may be events in the future that we are not able to predict accurately or over which we have no control. Consequently, any of these forward-looking statements may not prove to be correct, and actual results could differ materially from those projected or assumed in the forward-looking statements. Our future financial condition and results of operations, as well as any forward-looking statements, are subject to inherent risks and uncertainties, including but not limited to the risk factors set forth herein and those described elsewhere in this document. You should carefully review the risk factors included in other reports or documents made public by the Green & Healthy Homes Initiative, its partners, and other groups, especially any such document filed with the Securities and Exchange Commission including any filings titled: Form 10-12G, amendments thereto, any annual reports on Forms 10-K, any quarterly reports on Forms 10-Q and any current reports on Forms 8-K as well as any other publicly available information. All forward-looking statements and reasons why results may differ included in this offering circular are made as of the indicated date hereof and we assume no obligation to update any such forward-looking statement or reason why actual results might differ, even if new information becomes available or other events occur in the future.

Bibliography

- Center for Disease Control and Prevention. 2015. Accessed November 20, 2015.
<http://www.cdc.gov/nchs/fastats/asthma.htm>.
- Centers for Medicare & Medicaid Services. 2016. *Medicaid and Children's Health Insurance Program (CHIP) Programs; Medicaid Managed Care, CHIP Delivered in Managed Care, and Revisions Related to Third Party Liability*. Final Rule, Department of Health and Human Services, Washington.
- Meyer, Jack, Gaylee Morgan, and Mike Nardone. 2015. *Sustainable Funding and Business Case for GHHI Home Interventions for Asthma Patients*. Baltimore: Health Management Associates.
- National Heart, Lung, and Blood Institute. 2007. National Asthma Education and Prevention Program. Accessed November 20, 2015.
<http://www.nhlbi.nih.gov/files/docs/guidelines/asthgdln.pdf>.
- Norton, Ruth Ann & Brown, Brendan Wade (2014). *Green & Healthy Homes Initiative: Improving Health, Economic, and Social Outcomes Through Integrated Housing Intervention*. *Environmental Justice*, 7(6): 151-157.
doi:10.1089/env.2014.0033.
- Robert Wood Johnson Foundation Commission to Build a Healthier America (2009). *Beyond Health Care: New Directions to a Healthier America*. Accessed November 20, 2015.
<http://www.rwjf.org/content/dam/farm/reports/reports/2009/rwjf40483>

Appendix A: PFS Feasibility Rating Rubric

	Very high feasibility 5	High feasibility 4	Moderate feasibility 3	Low feasibility 2	Very low feasibility 1
Technical	Multiple independent, experimental or quasi-experimental studies and/or substantive operational data demonstrating achievement of the planned PFS outcomes with the planned PFS intervention, population, and setting.	Multiple studies and/or operational data demonstrating achievement of outcomes related to those in PFS plans. Studies are non-experimental and/or non-independent. Intervention may not be as complete as one in PFS plans, but is near complete. Population and setting are similar to those in PFS plans.	Plans for an evidence-based intervention aligned with established best practices that will be implemented for first time with PFS partners who have been providing similar services for multiple years. Partners have at least demonstrated positive outcomes with self-reported data.	Plans for an intervention supported with evidence from other settings or populations with PFS partners who have not provided similar services previously OR plans for a new intervention backed by little to no research with PFS partners who have an established working history.	Plans for an intervention backed by no evidence with partners who have no history collaborating or providing similar services.
Economic	Significant evidence of the full PFS intervention achieving measurable cashable savings, or outcomes that a potential payer values, substantially above all projected PFS intervention and transaction costs with a population and setting similar to those in the PFS plans.	Evidence of the PFS intervention, or components of it, achieving some measurable cashable savings, and/or outcomes that a potential payer values, above all projected PFS intervention and transaction costs with a population and setting similar to those in the PFS plans.	Evidence of the PFS intervention, or components of it, achieving outcomes associated with cashable savings, or outcomes that a potential payer might value, above all projected PFS intervention costs with a population and setting similar to those in the PFS plans.	Evidence of the intervention achieving outcomes associated with cashable savings, or outcomes that a potential payer might value, but unclear if savings/value outweigh projected PFS intervention costs.	No evidence of the intervention achieving outcomes associated with cashable savings or producing value for a potential payer.
Operational	Service provider(s) has multiple years partnering to successfully implement and manage performance of the complete PFS intervention with a scale, population, and setting similar to that in PFS plans.	Service provider(s) has multiple years partnering to successfully implement and manage performance of most components of PFS intervention at scale—or complete PFS intervention on smaller scale, but with necessary capacity and plans to scale and manage performance—with planned PFS population and setting.	Service provider(s) has multiple years successfully providing related services, but full PFS intervention is a new endeavor. Team has strong plans in place to scale and manage performance in the planned PFS population and setting.	Service provider(s) has no experience providing related services, but has plans to scale and manage performance. Significant untested assumptions exist related to PFS operational plans.	Service provider(s) has a history of not meeting performance management goals or intervention is completely new and team has weak plans in place to scale and manage performance.
Sociopolitical	Key internal and external stakeholders including pertinent local, state, and federal government agencies have actively demonstrated support of PFS project.	Key internal and external stakeholders, including pertinent local, state, and federal government agencies, are educated on and supportive of PFS project. Team is confident that no political barriers exist to structuring and launching the PFS transaction.	A few key internal and external stakeholders or pertinent local, state, and federal government agencies are educated on and supportive of PFS project. Team is unaware of any political barriers to structuring and launching the PFS transaction, but has not confirmed.	Team does not know who the key stakeholders are and has made no contact with any to discuss PFS project or some key stakeholders are ambivalent toward PFS project. Potential regulatory barriers to structuring and launching the PFS transaction exist.	Key stakeholders required to advance project actively expressed disapproval and/or significant regulatory barriers to structuring and launching the PFS transaction exist.
Payment mechanism	A clearly defined payment mechanism, including any applicable legislation, that has been used by similar projects exists.	A clearly defined payment mechanism exists that has not been used but has been committed to by the necessary parties.	A number of viable payment mechanisms exist that are supported but not yet committed to by the necessary parties.	A limited number of possible payment mechanisms exist but have not yet been discussed with necessary parties.	Few, if any, possible payment mechanisms are readily apparent or have a reasonable chance of being advanced.
Capital availability	Strong evidence of capital availability and investment, nationally and locally, from parties with a history of involvement in similar projects and active interest from one or more potential funders.	Strong evidence of capital availability and investment, nationally and locally, from parties with a history of involvement in similar projects. Project team has strong relationships with those parties.	Some evidence of capital availability and investment, nationally or locally, in related projects. Project team has limited relationships with potential funders.	Very little evidence of capital availability and investment, nationally or locally, in related projects. Project team has limited to no relationships with potential funders.	No evidence of capital availability and investment in related projects and/or active disinterest found among potential funders in investing in related projects.

Appendix B: List of Deliverables

The following deliverables were created as part of each Technical Assistance component of the feasibility project. Please contact GHHI at pfs@ghhi.org for further information.

Technical Assistance Service	Deliverable
1. Project Plan	<ul style="list-style-type: none"> • Membership Worksheet • Steering Committee & Core Project Team List
2. Data Request	<ul style="list-style-type: none"> • Data Request Worksheet
3. Payment Mechanism	<ul style="list-style-type: none"> • Success Payment Worksheet • Payment Mechanism Summary Report (Calvert Foundation)
4. Assess Service Provider Capacity	<ul style="list-style-type: none"> • Case Study • Output and Outcomes Report • Service Delivery Primer • Asthma Intervention Services • Scaling Considerations • Process Flow Narrative
5. Financial Model	<ul style="list-style-type: none"> • Financial Model
6. Finalize Intervention	<ul style="list-style-type: none"> • Process Flow Diagram • Intervention Budget • Data Management Plan • Documentation Resource Bank
7. Investor Inventory	<ul style="list-style-type: none"> • Investor Inventory Report (Social Finance)
8. Evaluation Model	<ul style="list-style-type: none"> • Evaluation Framework • Evaluation Resource Bank
9. Stakeholder Engagement	<ul style="list-style-type: none"> • Stakeholder Engagement Workbook • Health Policy Report (HMA)
10. Transaction Preparation	<ul style="list-style-type: none"> • Project Decision Workbook and Discussion • Feasibility Report